ITEMS OF INTEREST.

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Thots from the Profession.

ANIMAL HEAT.

J. F. SANDBORN, M. D., D.D.S., HAMBURG, IOWA.

[Read before the Iowa State Dental Society, at Des Moines, May 8, 1885.]

Physiology is a progressive science. New ideas are continually superceding the old, and the more philosophical are supplanting crude and questionable assertions. Physiology is the corner stone on which a successful practice is built in any department of the "healing art," yet few care to leave the more practical subjects to investigate those that still perplex the wisest. As the masses prefer to write on subjects requiring but a few hours of their precious time, I take the more difficult rather than see them neglected.

In the vegetable kingdom there is, during the growing season, a development of tissue, but not necessarily any breakdown of structure. In the animal kingdom there is a constant necessity for eating and drinking, not only for the purpose of furnishing materials for the development of structure, as in growth, but also for the supply of a constant waste?

Why this difference? Why this constant care and labor to procure food to supply this constant waste?

In the inorganic kingdom matter may exist from age to age without material change. It has no internal activity, as have all living beings. Wherever there is life there is a marked contrast to the ever inert condition of inorganic matter. The force exerted on the inorganic is always from without, and quite independent of itself; but wherever there is animal life there is an ever-present manifestation of force that is from within itself, and is always manifested whenever there is voluntary motion.

Force is that which occasions or arrests motion. Light is a manifestation of force, where the undulations of its connecting medium are over 34,000 to the inch. Heat is the same kind of motion, but with less velocity; so that whenever the motion of light or any other

mass of matter is arrested, heat is evolved. When a ray of light is arrested by vegetation a part is reflected, giving color to the plant; the remainder is changed to heat for the plant's benefit, and occasions it to become warmer than the surrounding air. There is also in this arrest of the ray of light a development of force which enables the plant to absorb matter from without, and elaborate it into its own tissue.

In the nucleus of the plant cell there is a motion of the protoplasm very analagous to bioplasm in animal life. The force producing this motion is primarily derived from the arrest of the rays of light. Deprive vegetation of sunlight and all cell motion ceases, the plant dies.

In the vegetable kingdom this life-force is derived from without, but in the animal kingdom it is from within, and directly from the break-down of its own tissue.

In matter there are two kinds of motion. First, mass motion, like the vibration of a viol string when it produces a tone; and, second, molecular motion, not discernable to the eye, but a vibration of the molecules of the body, the velocity of which determines the temperature, as cold, cool, warm, or hot.

Heat is a molecular motion, and in animals, when the heat is of an agreeable velocity, they are warm; if slow, they are cool or cold, and if fast, they are warm or hot.

Physics teaches that the luminiferous ethers are the medium for the transmission of light and heat, and that the motion producing this light or heat is an undulatory wave mass motion, which, on being arrested, is changed to a molecular vibration, and determines the temperature and luminosity according as it is fast or slow.

Heat as a molecular vibration, is always antagonistic to cohesive attraction. We anneal gold to separate the molecules, so that they will more readily impact and cohere; this is called welding of the gold.

Place in the fire of the blacksmith's forge, where the coal is in full combustion, two bars of iron; as heat increases it forces the molecular vibration in the iron, till the bars are expanded by the separation of the molecules, when, by placing them in contact, the blows of the hammer force the molecules of one into and between those of the other, and thus the two become one.

To further illustrate the influence of heat, take a block of zinc. In a cold state cohesive attraction among the molecules causes them to cohere, and we see the block as a solid, and a considerable degree of force is necessary to break it. This is because at the ordinary temperature the molecular vibration is vastly too slow to balance the cohesive attraction, and, while this is the case, it remains a solid. Increase the

heat to 400° Fahr., and it becomes brittle; increase the heat to 770° and the two forces balance and the solid has become a fluid. If we still increase the heat, the molecular motion so far exceeds the attractive force that there is a molecular repulsion, and the fluid becomes a gas. Reverse the process and apply cold and pressure to the gas, and it becomes a fluid. It is by cold and pressure nitrous oxide gas becomes fluid when condensed in the cylinder for convenience of transportation; or a fluid, as water, may become ice.

Any motion of matter, be it molecular or mass, must have a cause. In all inorganic matter this cause is always from without and beyond itself; and so it is with the organization of all vegetable tissue.

The change of matter from the plane of the inorganic to vegetable life which is the next higher, requires external force just as truly as such force is necessary to raise a stone up an elevation.

Organization, or the change of form or place of matter, requires force or labor. This is obvious. The reverse is equally true, so that in the disorganization of organic matter by the action of oxygen, force is evolved, as truly as the falling of a body, the lowering of the weight of a clock, or the change of matter to a lower plane of existence, as the combustion of wood or coal; all these are practical illustrations of this truth. All effects must have a cause. Animal heat is an effect —what is the cause?—where is it evolved?

Animal heat is a manifestation of force. To determine its source let us apply the law of physics, which teaches that the development of organic matter is at the expense of force, and whenever force is evolved, it is always at the expense of matter.

The practical observations of every-day life teach us that if we would have heat we must procure it by the combustion of matter, which is but the letting down of matter from a higher plane of existence—a change from the organic to the inorganic condition, thereby liberating the force stored in the raising of the matter from the inorganic to the organic condition.

We wind a clock, the lowering of the weight, or the uncoiling of the spring, distributes the force expended in the winding over several days or hours. So of animal heat; we must have the force from somewhere. Is it in the building of tissue, as Dalton, and some other authors believed? This cannot be, for we have shown that the organization of tissue, or the change in the form of matter, is always at the expense of force. This is a law of physics as unchangeable as the fiats of Deity.

Inorganic matter, if used as food, would require an expenditure of force to raise it from the plane of the inorganic to that of the organic condition, were it ever assimilated into the tissues of the organism.

This is not in accordance with the economy with which nature does her work. Inorganic matter can no more contribute to the force of the body than the stone found in hard coal can contribute to the genial warmth of the stove on a cold winter day; it not only does no good, but is worse than useless.

Let us follow matter used as food through the various changes it has to pass, and see if we can find the time and place where the molecular break-down takes place.

The consumption of wood or coal leaves us carbonic di-oxide and ashes; if we consume tissue in the body, we have carbonic di-oxide, and other remains to correspond to the ashes. For the purpose of this discussion, we will call attention to three classes of food:

1st. Nitrogenous; as lean meat, gluten, albumen, which are chemically, Carbon 48, Hydrogen 36, Oxygen 14, Nitrogen 6.

2d. Amylaceous foods; as starch and sugars:

$$\text{Amylaceous} \quad \begin{cases} \text{Starch,} & C.^{12}\ H.^{20}\ O.^{10} \\ \text{Cane Sugar,} & C.^{12}\ H.^{22}\ O.^{11} \\ \text{Grape Sugar,} & C.^{12}\ H.^{24}\ O.^{12} \end{cases}$$

3d. Fats and Oils ($C.^{56}\ H.^{108}\ O.^{12}$); by dividing these numbers by $4\frac{1}{2}$ we have Fats and Oils, approximately, $C.^{12}\ H.^{24}\ O.^{1\frac{1}{3}}$ The fats then have the same amount of carbon and hydrogen as grape sugar, but a much smaller amount of oxygen.

Digestion is a process by which food is changed from a solid to a fluid condition, so as to readily pass from the alimentary canal to the circulation. In the digestion of the nitrogenous foods, there is no chemical change in molecules from the time they are eaten till they become assimilated as tissues. The digestion of the nitrogenous foods is a mechanical, and not a chemical change. The same is true of the digestion of fats.

The solid or semi-solid foods, by the aid of mastication and the solvent properties of the gastric juice and other digestive fluids, are reduced to so finely a divided state as to be readily absorbed into the circulation, but no disintegrating change has ever been detected. The peptose and albumenose are of the same chemical constituents as gluten, fibrine or albumen.

In the digestion of the sugars and starches, there is a change in the number of the atoms in the molecule, but not of a breakdown character; rather the reverse, for the change is for the further maturing of the food, analagous to the maturing of fruit as it ripens.

The difference in the keeping qualities of summer and winter fruit, as apples, consists in the maturing of the contents of the fruit cells. When the fruit is green and hard, the acids predominate, and the starches, as such, do not molify them, but, on a further maturing of the fruit, the starch is changed to fruit sugar.

The starch ($C._{}^{12}$ $H.^{20}$ $O.^{10}$) becomes fruit sugar ($C.^{12}$ $H.^{24}$ $O.^{12}$), which is a developing change; the acid taste has been modified, the fruit becomes mellow and palatable, more healthful, as well as more pleasing to the taste. By the digestive process the starch and dextrine undergo a similar chemical change, and passes into the circulation as grape sugar.

Cane sugar is also changed by digestion to grape sugar. All the amylaceous foods on becoming digested, pass to the portal system as grape sugar.

It is the amylaceous foods that we depend on to prepare our domestic animals for shambles, so we may well infer that they pass to the pulmonic capillary circulation to receive a still further development, the better to fit them for the production of adipose tissue, which, instead of being an oxidizing process, is just the reverse—grape sugar, $C.^{12}$ $H.^{24}$ $O.^{12}$; fat, $C.^{12}$ $H.^{24}$ $O.^{1\frac{1}{3}}$, a difference of $O._{10\frac{2}{3}}$. The change, then, is a deoxidizing process.

Grape sugar, as such, can be traced to the pulmonic circulation, and no further; but on the change taking place, it becomes the elements of fat, which the bioplasts of the adipose tissues change to fat similar to the action of the bioplasts of the muscular tissue in forming muscle cells.

The third class—the oils and fats—are chemically unchanged by the digestive process, the digestion consisting of an emulcifying process, so as to readily pass the lacteals of the villi and the parenchyma of the messentary glands.

The fats and oils used as food are chemically the same as the adipose tissues formed in the process of assimilation. The fats have been called calorifacent food, and have been believed to be consumed somewhere without being assimilated—the location where has been a disputed point since the days of Liebig.

In tracing the fats from their first entrance into the circulation till removed in the process of assimilation, we find them as fats in a finely divided state, but nowhere in the arteries do we find the debris—the carbonic di-oxide and water; this proves that they are not consumed in them.

The blood in the arteries must pass the capillaries to reach the veins. Does the combustion take place in these? Let us consider their use and see if it does. The walls of the capillaries are from one-twenty-thousandth to one-fifteen-thousandth of an inch in thickness, say one-fifth of the diameter of the red blood corpuscle. This coat is composed of a single layer, and especially adapted to permit the plasma of every kind to freely pass for the building of tissue, and also for the free passage of oxygen to the tissues, and of carbonic di-oxide from the tissues. In the combustion of the fats, let us examine their

chemical composition and see what we shall find as the remains after the combustion, and where. Fat is $C.^{56}$ $H.^{108}$ $O.^{6}$. In its decomposition we shall find carbonic di-oxide and water. To do this we shall not want, in addition to the oxygen already there—$O.^{6}$)—$O.^{106}$, which $=O.^{112}$. This will combine with $C.^{56}$ to form 56 ($C. O.^{2}$), or 56 parts of carbonic di-oxide; and to reduce the hydrogen to water it will take $O.^{54}$. This will form 54 ($H.^{2}$ O.), or 54 parts of water. If this combustion takes place in the capillaries we shall find the debris in them; whereas we find only the gas there, which combines with the red blood corpuscle to form venous blood; but the water is found in the lymphatics. These broken down remains are found just where we should expect to find them if the combustion took place in the tissues; whereas, if it took place in the circulation, the watery portion, as well as the gas, would be found in the veins. The lymphatics are a set of vessels much like and as numerous as the veins; a part of their function is to take up this aqueous debris, filed with such broken down remains of the solid structures as are soluble in it, and carry this to the circulation for final elimination by the kidneys and skin.

Considering the chemical composition of the tissues, expecially of the adipose, what may we expect as a heat product from their oxidation.

In the chemical laboratory, the highest degree of heat yet obtained is by the combustion of pure hydrogen and oxygen in the compound blowpipe, which produces a heat so intense as to fuse platinum, that requires 4591° Fahr., a degree of heat more than double of that necessary to fuse gold (2616°); and a steel watchspring is sundered by it like a thread of linen.

In the experience of every-day life, we find the greater the proportion of the hydrogen to the oxygen in the fuel, the greater the amount of heat obtained on combustion. In adipose tissue there is eighteen of hydrogen to one of oxygen, so that in the oxidation of this tissue we may expect a great amount of heat for the quantity consumed.

In bituminous coal hydrogen is as six to twenty-one of oxygen. The heat generated by the combustion is too small to make a complete oxidation of the carbon, so that a large per cent. of it is lost in the black smoke that passes off.

In the composition of the adipose tissues the ingredients are in such proportions that there is no lost product—there is a complete combustion. This process is accomplished, according to our understanding, about as follows:

Oxygen is received into the blood in the capillaries of the pulmonic circulation, the red blood corpuscle acting as the vehicle for its transmission to the capillaries of the systemic circulation; it then

passes through these walls to the tissues. According to the microscopic observations of Leonel Beale, the plasma of the blood passes the coats of the capillaries and through the walls of the cells to the center of the nucleus, and there it becomes a part of the living, active, self-moving bioplasm.

The bioplasts are the workers that change plasma of the blood into tissue; each tissue having a bioplast peculiar to itself, that selects such plasma from the blood as will build its own tissue, and no other. This change of matter from plasma to tissue, known as assimilation, takes place at the circumference of the nucleus of the cells, so that the cells are always built on the inner surface next to the nucleus. All this requires an expenditure of force. To compensate for this building at the center of the cells, there is a continual taking down by the action of oxygen, a consuming of some part; as truly so as fuel is consumed in a stove to produce genial warmth.

In the combustion of wood by the disintegrating action of oxygen, or the oxidizing of metals which is a similar process, we see that it acts on the surface, and from thence inward toward the center, as disintegration takes place. In the combustion of tissue, the oxygen acts on the surface, on the older part of the cells first, and other parts subsequently as they come to the surface.

It is here we find the debris incident to the combustion, and it is here we find the development of animal heat as the product of this unceasing break-down of tissue. This is taking place in all parts of the system from birth till death.

The combustion of tissue, of whatever kind or wherever situated, contributes to this end; but adipose tissue, from its peculiar chemical constituents, is especially adapted to this purpose, and the quantity used from day to day is proportionate to the demands.

When we consider the economy as well as the harmonious action of all the functions of the vital machinery in producing the uniformity of action that constitutes health, warmth and comfort, to enjoy the blessings a kind Providence is daily bestowing on us, well may we say, "We are fearfully and wonderfully made."

To have gold show is what I was taught and was considered the correct thing when I attended college; but now the tendency on the part of the profession, as well as the patient, is to have as little in sight as possible. I have seen some teeth filled by college students, where much tooth-structure had been cut away and its place supplied with gold, where the original structure might have been preserved. I strongly condemn such practice.—H. C. REGISTER.

FOOD OF INFANTS.

FRED. HOOPER HAYES, D.D.S., DOVER, N. H.

The milk of the mother is the natural and only proper food for an infant. Therefore, the child should be entirely confined to it till the process of dentition has made some progress. I do not profess to be an authority, but I do feel that it is one of great interest to every practitioner of dentistry. We should be as well qualified to give advice and recommend a judicious course to be followed in this, as in any other branch of our profession. At birth the child has the germs of all the teeth. It is therefore very essential that special attention should be given to the period of gestation, and that the mother should feed on the most nourishing and lime-producing food. Much of the food that is daily consumed has lost nearly all of the phosphates so necessary for the development of the teeth and bones.

Very little attention is paid by the profession to the food of infants, and to infant hygiene. As a general rule, subject to a few exceptions, the mother's milk only will afford, during the first eight, ten or twelve months of existence, adequate nourishment, and is the best adapted to promote a proper growth of an infant's body. Food must vary in different periods of life. The infant needs a fattening diet; and this is supplied in the milk of the mother, which contains more of the butter (fattening portion) than does the milk of any other animal. The infant has much less exercise than the young of other animals, and does not require so much *azotized food.* Mortality diminishes with every day of advancing life. In the first year of life the stomach and intestines, in the second, the bronchi and lungs, are the sources of increase of the death rate.

It has ever been a problem to provide a suitable food for the young, wholly or partially deprived of its natural nourishment—the mother's milk. The nearer the substitute is to this, the better. When the milk furnished by the mother is too small in quantity, though good in quality, the infant should be supplied partly with cow's milk. By diluting it the proportion of caseine can be made to correspond with that in the mother's milk, but the proportion of albumen becomes less. Caseine is the pure curd of milk, and consists of carbon, hydrogen, nitrogen, oxygen, and a small proportion of sulphur. Albumen is easily digested, but the caseine becomes indigestible, being coagulated by the acids of the stomach. By the addition of water, the sugar, which is necessary for bodily heat, becomes less. Cane sugar will not answer, as, in order to be assimilated, it must first be converted into grape sugar by the fluids of the digestive organs, and these fluids are not secreted in sufficient quantity by infants. It also produces, by fermentation, acids in the stomach which result in

irritation. The presence of albuminoids is of the utmost importance in the nutrition of infants, as well as adults. Sugar should not be given as the principal food, but as an addition to less palatable articles of diet. Milk is supplied by nature to be our first food. This fact receives but little consideration by the dental profession. It contains representatives of all the substances which make the animal frame, and it is on this account that it occupies so high a position among articles of food. It contains curd, which has nitrogen, and is equivalent to albumen and fibrine, and represents the blood formers. It has butter and sugar. These represent the heat formers. It has salts—potash, soda, phosphorus, etc.

The spontaneous acidification of the milk is caused by the fermentation of the sugar of milk, under the influence of the caseine, which results in the production of lactic acid. Lactic acid is an important constituent of the animal body, being found in the juice of muscular flesh, and in the gastric juice. Food will be valuable in proportion as it combines, in proper proportion, the articles contained in the four groups, represented by albumen, fat, sugar, and salts.

All animal and vegetable life begins with the cell. No cell is formed without a minute particle of oil. The portion not used in forming cells is either burned to keep us warm, by uniting with oxygen, or is stored in the cellular tissue, adding to the bulk of the person. As the very beginning of life is dependent on fat, it is of importance as an article of diet. When not taken in as food, it is formed out of albumen, in the process of assimilation. Starch and sugar are never used in forming the tissue; but they perform important offices in the changes going on in the human organism. Wheat contains albumen, fat, sugar, and salts in excellent proportion. When not deprived of the bran, it is perhaps the very best supporter of animal life. For this reason it is called "the staff of life."

Scarcely anything in the form of food could be devised that is so little adapted for nourishment during the first months of existence, or more liable to produce derangement of the stomach and the infant's health generally, than the compounds of flour and milk, oatmeal and water, and the like. The powers of the infant's stomach are inadequate to digest properly the articles of food thus forced on it, and consequently results in gastric irritation, griping pains, disturbed sleep, and emaciation. The little sufferers often, too often, are forced to take more of the same food to relieve these troubles, or are given some carminative or cordial, and thus the mischief is constantly increased, till some severe disease is induced. A few vigorous children pass through these distresses produced by improper food without sustaining permanent injury to the health; often, however, the gastric irritation does not easily pass off and other dangerous maladies result.

Food improperly digested results in improper fermentation and decomposition. In children it causes sour stomach and vomiting.

There is little danger to the teeth when the child is supplied with its mother's milk. But all the tissues get just the nourishment they need. The different parts of the body require different materials for their formation and sustenance.

As a general rule, it is a duty incumbent on every mother to nourish her own infant. Occasionally the mother is incapacitated by disease, or a defect in the nutritive properties of her milk, and it becomes necessary to transfer her offspring to the care and nourishment of a nurse, or to resort to cow's milk. A course should be followed which is best calculated to produce the best results in the dental structures. When "infants's food" is added to the cow's milk, it should be one containing a sufficient quantity of the phosphates which so powerfully assist in the proper formation of the teeth and bones. The utmost care should be taken to keep the sucking bottle perfectly clean and free from acidity. The danger which attends every attempt to rear an infant by hand, as it is termed, is now very generally recognized by mothers.—*Ohio State Journal.*

IRREGULARITIES.

DR. O. A. JARVIS.

When in their normal position the six upper front teeth lap over the corresponding six under teeth, the first bicuspids strike between the cusps of the two under bicuspids, and so on, each tooth striking two antagonists, the cusps or points interlocking in regular order. But it is common to find variations from these positions. The *causes* are various. Sometimes it is the result of the premature extraction of the temporary teeth; more generally a lack of correspondence in size between the jaw and the teeth. This last is largely caused by the want of exercise which produces *development* of the jaw. Hereditary causes have much to do with it. The evils resulting are numerous, among which the deformity of the features is the most to be lamented. There is also interference with the movements of the lips and tongue; the effects on the voice; the greater difficulty in cleansing the teeth, and the increased liability to their decay.

The treatment is complicated, tedious, unpleasant, and expensive. Yet in most cases the irregularity can be remedied. The operation should usually be deferred till the most of the teeth have taken positions, from thirteen to eighteen years of age.

Dr. E. R. Pettit has such a horror of wearing a plate that he would rather have his front teeth built up with gold, if they needed it, than to wear an artificial substitute.

PYORRHŒA ALVEOLARIS.

(Letter from Dr. Briggs).

To the Editor *Southern Dental Journal.*

DEAR DOCTOR:—Yours, with queries, is received. Of course I can judge little of the case you mention, not seeing it from my standpoint. The best answer I can make will be to delineate my treatment of it, *ab initio.*

To reiterate my oft-repeated views, I should rely only on *surgical treatment* for the *curative processes*, and *afterward*, on some simple *palliative* remedies, as topical treatment to the gingival margins. The object of this subsidiary treatment would be to allay any little unrest, or slight pain, that may follow from the severe operation of making a *fresh* wound of a *chronic* one. In the worst cases, I use phenol sodique, one-forth dilution, applied by myself on a pellet of cotton, after the sitting; then I order myrrh tincture, full strength, touched by the index finger of the patient to the margin of the gums, every waking hour for the first day, and several times a day thereafter for a week. The alcohol of the tincture stimulates the gum tissue sufficiently, and the myrrh has the best of therapeutic properties.

I inject nothing beneath the gum, not *even water*, for anything, so used, would wash out that protoplasmic exudation from the *fresh* wound which should remain undisturbed, [a good idea—Editor ITEMS.] If the surgical operation be well and skilfully done, any "*pocket*" there may be will be filled with fresh blood, which will be metamorphosed very soon into a formation of flesh and blood tissue, that just answers Nature's demands. If we wash out these formative bodies, or inject an escharotic, and sear the tissues it touches, we do harm, and nature will sharply rebuke us for our presumption. It is a work of supererogation, which she will not enter in the credit side of our account.*

The curative power, then, resides in the perfection of the surgical operation, and not in the therapeutic treatment. In the first and second stages of the disease, no palliative remedies are *really* needed; but in the third and fourth, they assuage the pain incident to the severe operation, and constrict the gums about the necks of the teeth thus shutting out foreign bodies from crowding under the gums. Yet I prescribe the above-named remedy for the *after treatment* in *all stages* of the disease. It warms the mouth, and sustains the interest of the patient in the recuperative power of the operation.

The instruments necessary for the treatment consist of a set of six, and can be obtained of dental dealers. Their manipulation is peculiar and particular, and needs minute, critical, clinical instruction, for any

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* This is an important idea, and is the secret of many reformations of tissue which is often credited to some medicine.—Ed. ITEMS.

to successfully treat these cases. Failure, either entire or partial, will confront the beginner, unless he is furnished with the right methods of procedure to begin with; besides, I submit the point, is it fair, and in accord with the ethics of the profession, to experiment blindly on the patient, when ample clinical instruction can be obtained?

It would take many pages to describe the relative position of the operator to the patient—the mode of holding the instrument—its various motions *on* and *about* the tooth—its progress down the line of health of the tissue—and its clean and perfect work on the tooth in its passage to that line. The blood wells up over the tooth, so that the eye is of limited use, and the operator must learn to go forward with his work, without halting to wipe away the blood so as to see the parts. He must distinguish by the delicacy of touch of the fingers what his instrument impinges, whether limey concretions, or abnormal ulcerative peridental membrane; or the regular or irregular absorption of the aveolus, and its condition of health or of disease. He must so minutely know each undulation or depression of the periphery of the tooth, that his instrument may unerringly follow its surface, and touch every hair's breadth of it; for all metamorphosed or diseased membrane must be broken up, to enable nature to cast it forth, and to apply her recuperative processes. We must also remember, that, though the gums and the aveolus are the culminating territories of this disease, it is far-reaching in its effects. Its inflammatory action pervades the malar, nasal, and other bones of the face, involving the nerves that traverse both the outer and inner plates or surfaces of these bones, and their lining, or mucous tissues. Hence all catarrhal affections are aggravated,—in my own experience, in one case, the sight was affected to partial blindness; in another, a complete paralysis of the upper lip, attended with severe neuralgia of the face and head; in another, the tongue was so much swollen that deglutition of solids was impossible—the right and left edges of the tongue to the tip were so eroded as to resemble raw beef, and that organ was pronounced cancerous by a respectable physician, and operation for its partial loss advised.

This enumeration of the effects of this disease omits all mention of gastric, renal, and other derangements, including those of the alimentary canal.

All these cases, and many more of a milder type, were entirely cured by surgery, applied to the gums, teeth, and alveolus of the inferior and superior maxilla.

When our old friend the moon is full, a warm period is at hand, and it storms in forty-eight hours after it is full, or after it commences to wane.—*Problems of Nature.*

PEROXIDE OF HYDROGEN.

DR. W. W. ALLPORT, CHICAGO.

The peroxide of hydrogen (H^2 O^2), though not a new remedy, has only within the last few years gained much prominence in the treatment of surgical diseases. One of its uses in dental and oral surgery is in blind or deep-seated abscesses, such as arise from roots of diseased teeth. As the tendency of pus is always downward, when these cases occur in the lower jaw it is not infrequent that the abscess, if left to itself, and sometimes even after the tooth is extracted, will point through the external tissues at the lower margin of the jaw, and occasionally downward between the muscles of the neck, and open at various points, even as low down as the clavicle. The usual treatment is to extract the tooth and evacuate the pus through the alveolus, but it often happens that the formation of pus and the continuance of suppuration is not checked, and the abscess points, or is opened through the external tissue of the face or neck, leaving, when healed, a disfiguring scar.

By injecting peroxide of hydrogen into such abscesses before they point through the external tissues, this serious disfigurement can usually be averted, and the suppurative process is materially shortened. It is also a valuable aid for the evacuation of the purulent contents of the antrum of Highmore, in catarrhal and suppurative inflammations, and especially where the sinuses are divided into two or more pockets by bony septi. These cases are often protracted by the inability of the surgeon to perfectly evacuate them. But with this preparation it becomes a simple matter after access has been gained to the cavity by the extraction of a tooth or the perforation of its external wall in the proper place at the juncture of the cheek with the alveolar border. A free opening must always be made for the escape of the contents, in order to avoid pressure from the rapid evolution of gas. Two or three applications of a dram each is usually sufficient to completely empty the sac.

It is used with the most gratifying results in the treatment of pyorrhea alveolaris, and is an invaluable agent in treating pulpless teeth, as by its action all decomposed matter from the pulp chamber and dentinal tubuli is readily ejected, thereby removing the most frequent cause of the discoloring of this class of teeth, of inflammation of the peridental membrane, as well as alveolar abscesses.

The efficacy of peroxide of hydrogen depends on the ease with which it is decomposed into oxygen and water. Pus is one of the many substances which causes this decomposition. Hydrogen peroxide acts first chemically and then mechanically. When the decomposition takes place the oxygen is set free and escapes from a liquid to a gaseous form; this expansion of the gas distends the pus cavity, and as it escape

from the orifice, it carries much of the pus with it, and its application should be repeated till all purulent accumulations are evacuated. The liberated oxygen, being in a nascent or active condition, rapidly oxidizes the products of suppuration, and destroys many of the micro-organisms of suppuration.* Hence it is a disinfectant and anti-septic.

Finally, peroxide of hydrogen, after its decomposition, leaves no material in the system which is foreign to the system, and it is, therefore, one of the most efficient and harmless disinfectants and anti-septics that can be used, in all forms of purulent inflammation.—*Address at American Medical Association.*

AN OUTSIDE THEORY OF TOOTH-GROWTH.

H. B. PHILBROOK, EDITOR *Problems of Nature*, NEW YORK.

Now, will the dentist accept what will be here given? About nine-tenths of them will, for it will be only what is impossible to deny. Not one in a hundred will give us credit for it. A tooth is only a bone of a trifle harder character than any other bone of the body. It decomposes all the time at a gradual and constant rate. No acid or insect is decomposing one of these organs. The acid of the mouth is able to do no more toward decomposing a tooth than the water and the atmosphere out-doors are in decomposing a bone.

The decomposition will take place anywhere if a current of electricity can circulate on the surface of an object, or around its parts. This is what decomposes all substances, and the degree of decomposition corresponds to the activity of such a current. No other means of decomposition is possible. A fire is only a greater manifestation of the work.

A current of electricity in the saliva of the mouth is all that gives the substance an acid character. The acidity is slight, about as much of an acid character as a few drops of lemon juice in a tumbler of water will produce. A constant decomposition of the teeth is going on, and it is only what is occurring in every part of the body. The nerve is doing its duty if it continues to supply a partly decomposed mass of corpuscles from its interior to construct the tooth as fast as decomposition takes place.

All that constructs a tooth is a discharge of the partly decomposed corpuscles called cells of the nerves that terminate in a jaw. This substance is consolidated, and becomes bone in the same way a decomposed amount of marrow in a bone is enabled to become bone. The marrow is only a mass of corpuscles obtained from the blood.

The corpuscles of a nerve are obtained from the brain, and the corpuscles discharged from an artery that is crooked in a cranial cavity are constituting a brain. A good toad stool.

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* See Gradle on "Bacteria and the Germ Theory of Disease," pp. 39 and 151.

All the cells of the nerves are obtained by a pressing of the cells of a brain into them; a current of electricity is doing the pressing, and all the decomposition of the cells besides.

Our eyes are constructed precisely as a tooth is, except a greater nerve is given an eye,—a condition of decomposed corpuscles that permits the construction of a quantity of *vitrous umor,* a lens of only a little more consolidated *umor* and a quantity of a thinner condition of the same substance called *aqueous umor.* Only a single substance —decomposed corpuscles—is converted into an eye. The outside of the eye, is only this substance still more consolidated, and almost as hard as a tooth and as white.

The only thing that makes a tooth so hard and glossy is the water in the mouth, which operates to plug all pores of the tooth, and render it enamelled, so called; a similar work to what is seen in a petrified piece of wood.

Now we can assure all the dentists of the country that only a constant discharge of *vitrous umor* from a nerve is wanted to continue a construction of a tooth. When this is not performed a tooth will decay—only a decomposition without a new supply of substance. The old stump of a tooth is often kept growing and its new parts broken off, when a person is improved in health.

All that stands in the way of a perfect understanding of a construction of a tooth, by the profession of dentistry, is the absurd idea that a tooth is grown from the gums or jaw. A tooth hangs on the end of a nerve that discharged its substance.

An eye also hangs on a nerve that constructed it.

In children, a second tooth is constructed before the old one is out; a use of a *vitrous umor* by a new tooth, deprives the old one of the substance.

The Medical and Dental Electric Lamp.—The electric lamp used for examining General Grant's throat is manufactured by agents of the Edison Light Company. It is mounted on a hard rubber holder, about seven inches long, having a reflector at the lamp end, by which the light can be thrown in any desired angle. The holder is connected by two silk-covered wires to a small storage battery carried in the pocket of the physician. The light is turned on by simply pressing a small button on the rubber holder, and the quantity is governed by another button convenient to the operator. The lamp is inserted in the mouth almost to the palate, with the reflector above the lamp, which throws the light down the throat. The lamp has no unpleasant heat, and gives a light equal to half a sperm candle. The extreme simplicity of the whole appliance makes it very valuable to the physician and dentist.—*Scientific American.*

WHAT CAUSES TOOTH DECAY?

The philosophers of this country and Europe have been very busy of late straining their eyes to discover, per microscope, the ossivorous bacteria and festive leptothrix. Of course they have been found and their habits noted, and now we are told a cock-eyed fellow of browsing proclivities appears on the scene, and is vigorously disposing of the dentinal herbage, and making a brave struggle for existence. What are we coming to, if this raiding on personal property is not stopped? Not a tooth will be left us if these imps of destruction are not muzzled and a check placed on their rapacity. I have diligently searched for the leptothrix, and hoped to find him in his moments of festivity, but, blister my eyes as I may, the effort thus far has been fruitless. The aforesaid philosophers have amused themselves vastly, and their enjoyment has been full. Seeing by faith alone, we have partaken of their joys till we also are full, and, as common-sense professionals, are tired of amusement. *We are sickened by the nonsensewhich attributes dental decay to the action of microscopic tigers and wolves.*

The cause of decay has long been understood; it is no secret to those of sense possessed, and is *shown by the simple chemical experiment* of *immersing an egg in vinegar.* This will tell the whole story. Did you ever try this experiment? Do so, and you will, in a few hours, ask what has become of the *lime that was in the shell? The acid of the vinegar has dissolved it, and nothing but its cartilaginous portion remains.* Dental decay is the dissolution of lime-salts by the presence of an acid, and the progress of decay is according to the measure of its strength. One says, the *germs* of the vinegar produced the change. If the *wigglers* inhabiting that acetic territory are equal to that, their teeth are better than mine.

You may look through all the woods, ravines, and mountain ranges of the dental continents, and these severely-hunted animals will be found entirely harmless and non-destructive, *living, moving, and having their being because of favoring conditions, and not producing these conditions. When in contact, the teeth catch and retain foreign matter, which, when acidified, produce decay; when separated properly, the retention of this matter ceases, and the cause of decay passes away by a healthful disturbance in the act of eating.* Separating skilfully always arrests decay, and, if done early enough, entirely prevents it.

Decay, when produced by a direct or highly acute acid, is very white; the enamel and dentine are not only softened but bleached by it, and its progress is very rapid. Decay, from dilute acids or the gradual decomposition of food, at first has no color, but assumes a brownish tinge as each successive layer of softened bone is exposed to the air. [Extract from report of the N. Y. Odontological Society, in *Cosmos.*]

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The National Association of Dental Examiners held its fourth session in Curtiss Hall, Minneapolis, Minn., commencing Tuesday, August 4, 1885. President J. Taft in the chair.

The following State boards were represented, the four last named being new members: Ohio, by J. Taft and H. A. Smith; Illinois, by Geo. H. Cushing, A. W. Harlan, and C. A. Kitchen; Pennsylvania, by E. T. Darby; Maryland, by T. S. Waters; Michigan, by G. R. Thomas and A. T. Metcalf; Louisiana, by Joseph Bauer; Indiana, by S. B. Brown; Iowa, by W. P. Dickinson, J. T. Abbott, J. Hardman, J. F. Sanborn and E. E. Hughes; Dakota, by S. J. Hill; Kansas, by L. C. Wasson and Wm. Shirley; Wisconsin, by Edgar Palmer, C. C. Chittenden, B. G. Marcklein, E. C. French and J. S. Reynolds; Minnesota, by S. T. Clements and G. V. I. Brown.

The following boards belonging to the association were not present: Vermont, New Jersey, Georgia, West Virginia, Mississippi, South Carolina, and Kentucky.

The following resolutions were adopted:

Resolved, That this association most earnestly commends the action of the Wisconsin and other State Boards of Dental Examiners, in refusing to accept the diplomas of the so-called Wisconsin Dental College, located at Delavan, on the ground that it is not a reputable school, and recommends to all State boards to which the diplomas of that institution shall be offered that they likewise refuse them.

Resolved, As the sense of this association, that persons engaged in the study of dentistry, and physicians practicing as such, should not be considered eligible to registration as dentists.

Resolved, That this association recommends that all applicants holding diplomas from the Royal College of Dental Surgeons of Ontario be required to submit to examination before they are granted license to practice.

WHEREAS, The dental law of the State of Maryland seems to be restrictive in its character; it is the sense of this body that the dental profession of that State should, at the next session of its Legislature, seek to have this dental law so amended as to be in harmony with the dental laws of the other States.

Resolved, That the secretary be instructed to forward a copy of the above resolution to the State Board of Dental Examiners of Maryland.

Resolved, That this association recommend all State Boards not to grant temporary license to first-class students, or any others, unless fully satisfied that such applicants have had at least two years of practical clinical instruction. Such applicants shall also pass a proper theoretical examination.

The following officers were elected for the ensuing year:—
J. Taft, president; T. S. Waters, vice-president; George H. Cushing, ecretary and treasurer.

THE NERVE CENTERS AND THE TEETH.

J. SMITH DODGE, JR., M.D., D.D.S., NEW YORK.

The dentist need not look beyond his own field to find ample proof of nerve influence on the teeth. As regards the influence of maternal conditions during gestation on the tooth-germs of the fetus, the evidence is beyond doubt. The journals have for years contained reports in which successive children of the same mother showed different qualities of teeth which corresponded with differences of maternal regimen. Most commonly the difference is spoken of as a varying supply of lime, the use of unbolted flour, the administration of lime-salts, removal to a lime-stone region. But these are likely also to be causes of improved general health, and so of increased neural energy; and this view is confirmed by other testimonies which give the same results from other methods of general improvement. The members of the Odontological Society will remember Dr. Rich's account of the benefit exhibited in the teeth of children from gymnastic training of their mothers. So it looks to me plain that we are not to regard this matter as one of more or less material for tooth-building, but as concerning the ability of enamel-organs and odontoblasts to work up the material at hand into perfect tissue.

But the influence of maternal organism becomes less immediate at birth, long before the permanent teeth have completed their structure; and at this period we must look to the nerve-centers of the child. Now, I can hardly conceive any observing dentist doubts the influence of infantile sickness or health on the character of the permanent teeth. The various forms of atrophied enamel are now, as they have long been, considered the results of general disease during their formation; and the different quality of dentine and of enamel, without defect of form, which so often distinguishes teeth of simultaneous development from those formed earlier or later in the same mouth, can frequently be directly traced to grave fluctuations of general health. Indeed, I am convinced that the inferiority of the first permanent molars is largely due to the general disturbances which so commonly accompany the first dentition.

A step further brings us to consider the teeth that belong to the so-called nervous temperament. When this phrase means, as it did in the old physiology, a harmonious organism thoroughly ruled by a well-balanced nervous system, we find admirable teeth—small, a little spaced, of a dark but translucent yellow, and very enduring. But when the phrase means, as it does in popular use, a fragile organism, overridden and devoured by hypertrophied nerve-centers, we find, together with the vivacious spirit, the brilliant eye, the transparent skin, and the weak lungs, pearly teeth, which you can almost

see through, beautiful while they last, but easy to cut and doomed to decay.

Thus far we have been concerned with the original formation of the teeth. But turning now to their subsequent history, we shall find numerous illustrations of our theme. We have all groaned in spirit over the teeth of children hard driven in study and pleasure. The original sensibility rises to the point of a positive neurosis, and month by month they melt like snow. We all know the destructive results to the mother's teeth during pregnancy and of the depression of vital energy which so often follows it. Something has evidently enfeebled the teeth. In New York the fashionable world dissipates all winter, and aims to recuperate in summer. I have found it a common thing that the same women's teeth, which were fairly normal in the fall, become sensitive and decaying by spring; and I have often found the condition reversed again after a summer reasonably spent. Finally, in old age, teeth which have withstood the work of a life-time frequently succumb to rapid, diffuse, painless decay, which forces on you the conviction that somehow life has half deserted these outworks and abandoned them to the enemy.*

Now, all these instances bear on the same point, namely, that whatever at any period of life exhausts or prevents the action of the great nerve-centers impairs the power of the teeth to resist the ever-present causes of decay. More might be added, but it is needless. I am convinced the nerve-centers hold sovereign sway over the formation of the tooth and the nutrition of its tissues; so that without proper and constant influence from those centers, the formative elements are unable to perfect their work, and if this sustaining power be impaired or withdrawn the teeth become an easy prey to the manifold agencies of ruin which surround them.

If these views be correct, we are confronting, in the ruinous decay of teeth, only one angle of a many sided subject; and indeed we can hardly stop short of philosophizing on the entire structure of modern society. Formerly man ruled the world by muscle and bone. The strong arm, the brawny back, the impetuosity of animal vigor made the ruling men and the ruling races. Now man rules the world by his nervous system. Clearness of understanding, tenacity of purpose energy of will, make now the kings of men. It comes to pass, therefore, that those races rule which can put forth most forcibly and sustain longest the powers of the nerve-centers. Each man, each race, rivals the others, till we begin in our time to see a one-sided develop ment of the best races, which is the exact reverse of what prevailed a thousand years ago, when the leaders of the world were brutal giants,

*We think this is not frequent. As a rule, the teeth of the aged is not as subject to caries as the teeth of the young.—Ed. Items.

ruling by bone and muscle, with intellect and sentiment shockingly atrophied. To-day the other end is up. It is brain and will that rule, dwelling perhaps in a hundred and twenty pounds of anguished flesh, tormented with dyspepsia and insomnia. That this modern man has bad teeth, and his children worse, is only a part of the same physical atrophy, the price he pays for hypertrophied nerve-centers.

I have spoken of the *man* of to-day, but the same thing is true of our women. Having within the last few generations come, into the sovereignty of the social world, how infinitely more delightful they make it by their charms of mind and sentiment than their predecessors ever did by mere force of physical charm. That is to say, they exactly parallel the man. They have replaced the former reign of beautiful flesh by a nobler reign of delicate and exalted nerve-centers, which, as before, cultivation and rivalry push to the last extreme.

Now, when this man and this woman combine their energies for the initiation of a new life, it may easily be foreseen that their nervous systems, racked and exhausted by these perpetual struggles, will have too little latent energy remaining to endow their offspring. You cannot eat your cake and have your cake. Neither can you spend your neural force in the service of individual life and at the same time respond normally to the large demands of reproduction. It is an old observation that all unusual expenditures of brain-force tend to produce sterility. For the same reason they lower the quality of the children whose conception they do not prevent. And this deterioration, of course, follows the lead of the parental organism. Everything else is stinted (since there is not enough for all) that the nerve-centers may be largely and rapidly developed; and in the first rank of the organs which suffer is the entire dermal system, which includes the teeth. The skin itself, the hair, the nails, as well as the teeth, become more delicate, slender, incapable of resistance. And presently comes the second stage of this sad, eventful history. This one-sided little creature is hardly aware of his new surroundings before parents, nurses, and friends begin to stimulate his over-grown nerve-centers, delighting in every evidence of precocity, and pushing him step by step through successive studies and pleasures far beyond his years. What city dentist has not been dismayed to hear of the school and home studies, music lessons, dancing lessons, matinees, balls, and all the rest, which make it difficult to find time for the care of this little darling's half-constructed teeth? And who has not read the end of it all in the mother's elegant mourning? The painful, perishing teeth are an integral part and a fair index of the entire physical condition.

And so we come round, through all these considerations, to perceive that the increasing frailty of the teeth is not due to this or that matter of diet or regimen, but is part of the general fact that parents

and children alike spend so much nerve-force on the world without that they have not enough left to nourish rightly the tissues within.

But it is time to ask if there be any remedy. Thanks to the marvelous recuperative power of our race, there is. I believe it may be possible, even in the individual, and certainly in the second generation, to turn inward this stream too prodigally wasted without, and utilize for self-support the vast neural power which modern times have developed. Where the income is assured it is only necessary to restrain waste, and wealth will follow. The last twenty years have made a promising beginning in the management of children in dress, diet, ventilation, and exercise. But these are only the fringes of the matter. Two things remain of prime importance: First, let conception be to every wife the signal of a new, an imperative, and an honorable duty, namely, the duty to cultivate all her energy of mind and body in quiet, simple ways, and to stop all waste of nervous force, whether in pleasure, work, or worry—that the new life which feeds on hers may satisfy its great requirements from an ample store. Secondly, let precocity be considered a danger to the child and somewhat a disgrace to the parent—a thing not always avoidable, but never to be desired or forwarded.

How far off may be the realization of such dreams, it would be foolish to predict. But as one who has an abiding faith in the future, I am glad to observe the beginnings of better things, and I do not hesitate to prophesy that some day all this and more will come to pass. For the present the disproportionate strain put on the nerve-centers wears out the organism that should serve all the purposes of life. The tool crumbles under the stroke. But let a few generations of proper regimen bring up the general development to match this enormous energy, and the world will see a race of men whose thought and sinew will tame the elements, and whose teeth will grind for a hundred years the food that feeds them.—Trans. Odon. So., N. Y., in *Cosmos*.

Somebody has said, what everybody has observed, that those persons who have attained to eminence in any vocation of life have followed a uniform course of earnest work and unwearied application. None are truly happy but those who are busy; for the only real happiness lies in useful work of some kind, of the hand or the head, or still better of both; but overexertion must be avoided. It should be the aim of every one to be employed. If all men and women were kept at some useful employment, there would be less sorrow and wickedness in the world.

THIRD DENTITION.

After reading the article by Dr. Dunlap in the August number of the ITEMS, under the above heading, I thought a case of mine might be of interest to some. A young lady of sixteen came to me in May, 1884, wishing the two lateral incisors extracted. They were very much out of place, and in a bad condition to save. She thought she could not undertake the regulating method. Her idea was to have them out, and have a plate made with the laterals on it. She said the temporary laterals were extracted by a physician of this place about five years before; the Fall after that, the young lady took out the temporary centrals herself, which were soon replaced by the permanent centrals. The permanent laterals were not erupted till nearly three years after. I am positive that the teeth I extracted were the permanent laterals. After extracting them, I tried to have her wear ligatures to draw the centrals together, as they were a little apart, but she could not wear them, the pain was so unendurable. I did not see her again till the following September. I now saw that the centrals were still farther apart and that two new teeth were growing in the place of the laterals that I extracted in May. I did not do anything with them then, but last May (1885) I removed them—they were sound and perfect as to shape but had little depressions in the ends making them look like small bicuspid teeth. She is now wearing (a few hours at a time) a regulating plate I made her for the purpose of drawing the two centrals together and back into the arch. The plate is of rubber, made to fit the mouth inside of the teeth, with a ridge across between the first bicuspids; two small holes are drilled through the ridge close to the plate and, with a fine saw, I cut down from the top of the ridge to the holes, thus making a stud—two rubber bands are then passed from the stud to each tooth, drawing them together and back into the arch. When they are back against the plate, they will nearly, if not quite, fill the space of the extracted laterals. Is this a case of supernumeraries, or third dentition ?

I have a model such as you described in August ITEMS OF INTEREST 4 x 3½, supposed to be the model of Sojourner Truth's mouth.—Came from Boston.

J. A. ROBINSON.

MORRISVILLE, Vermont.

A Very Small Plate.—Dr. J. B. Helper, of Sigourney, Iowa, sends us the measurement of an exceedingly small plate he has made for a lady 45 years old. The cast on which it was made was only one and one-eighth inch across, and one and a fourth inch on median line.

SHEET WAX.

Editor ITEMS :—

Your *Journal* has contained several suggestions with reference to the manufacture of sheet wax. I think none of the methods given are quite as satisfactory as the process explained to me by Prof. Frank Bell, of the Ohio College of Dental Surgery, *viz :*

Melt pure beeswax in an oyster can* that has been opened at the end. A "paddle," about three by four inches, made of picture-backing† and quite smooth, being previously dipped in water, is now dipped in the melted wax, and instantly withdrawn. By allowing the wax on the paddle to cool slightly, and immersing again and again, a sheet on each side will be made of the desired thickness.

By dipping the waxed paddle in water the sheets of wax are loosened.

The paddle being again cooled and wet, proceed as before to make two more sheets of wax.

No water should be put in the can containing the wax.

A. W. PAFFENBERGER, D. D. S.

MC. ARTHUR, O.

Disgust for Decayed Teeth—We recall the case of a gentleman of ability, and an earnest Christian worker, who began a worthy enterprise of some magnitude, that would be advanced by the recognition and encouragement of prominent men in the same line of effort, and he presented his plans to a man of national reputation for his endorsement, and the gentleman refused to have anything to do with it. In speaking of the matter to a friend afterward, he said, in explanation of his refusal, "What man can accomplish any good who has a mouth in such a condition, sending forth pollution at every breath ?"

First impressions are very forcible, and this man will have none but a poor opinion of the good man who sought his assistance. With the work he was in sympathy, but with the medium he had disgust.

Some people are too lazy, and others think they are too busy to properly care for their teeth by brushing and cleansing them regularly ; but if people could only see the condition of their mouths and teeth as easily as they can see the condition of their hands, there would be less carelessness in this respect. As a result, there would be less toothless men and women, or what is worse than toothless, people with their mouths filled with decayed and broken teeth, that stare out at the beholder like the skeletons of departed friends, standing in ghastly array, in the cavern that has become their grave.

*People that live so far from oyster beds that they only get oysters in tin cans, should not suppose we who are obliged to eat the oysters before they are canned, know what an oyster-can is. Having been in the West where they raise canned oysters we can remember that an oyster-can is good because deep and narrow—about three by five and seven inches deep ; but use any tin that will give depth to the amount of wax used.

†If picture-backing is not easily gotten, make the paddle from a cigar box.

The only rule that will apply always and everywhere for the preservation of the teeth in their natural condition, is *scrupulous cleanliness*, and even this will not always accomplish that result, but if begun in childhood and continued unremittingly there will be very little demand for the services of the dentist in extracting aching teeth. However, the teeth will decay to some extent and it becomes necessary to preserve them by artificial means, that is by filling, and every person, from the age of six years upward, should visit a competent dentist once or twice a year and have the teeth examined thoroughly, and, if any decay shows itself, have it filled at once. It is well, in this matter, to have a family dentist, just as you have a family physician, and always consult him in matters pertaining to the teeth or mouth.—*Health and Home.*

Bacteria proper are not found in decaying teeth, that is, the decayed substance itself. They are found in the food, and about the teeth. Leptothrix are also found in large quantities in decaying teeth, but it has never been shown in this country (and I believe we have made as careful examinations as have been made anywhere) that these organisms play any part in the decay of teeth. They are simply organisms that present themselves in large numbers and thrive as soon as decomposition of the tooth substance begins. In ulceration of the mucous membrane of the mouth you find the same thing. I think I have shown very conclusively that decay of the teeth first begins by a dissolution of the lime-salts by an acid, and the moment the living matter in the tooth is exposed, there is an irritation set up which penetrates the tooth structure, sometimes to, and even beyond, the pulp itself, when only a very small portion of the tooth is destroyed. Under a low power all specimens of carious teeth present the appearance of decalcification. If you raise the power of your microscope and have your specimens thin enough, you observe that these conditions are the various stages of decalcification and absolute inflammatory reaction. No leptothrix or micrococci are found, excepting where decomposition of the tissue has commenced. The acid condition that exists at the bottom of a cavity, where the partially-decalcified tooth-substance is necessarily left in many cases before filling, can be neutralized by coating that portion of the cavity with precipitated chalk. It may be used either dry, or mixed with creosote; if used with creosote, the antiseptic effect of that substance is also obtained, which possibly may be desirable. If a tooth is hermetically sealed by the filling, the partially decalcified portion becomes recalcified—so much so, that often that portion of the tooth appears to contain more lime-salts than even normal dentine. This process of recalcification sometimes takes place where no filling has been done; decalcification stops, the inflammatory process subsides, and a re-deposition of lime-salts takes place.—FRANK ABBOTT.

DR. BONWILL'S MODE OF FILLING TEETH.

Dr. Elisha Townsend made a great mistake in making separation narrow at the cervix—that is, V shaped. My early prejudice against amalgam lasted eight years. I was worked to death by using tin foil. This material wears away very rapidly; I know now that amalgam is better. My researches in dentistry have taught me to reverse many accepted opinions. I do not recognize galvanic action, but chemical action, in caries. The majority of teeth that come to us are defective in construction. We will have decay again, no matter what materials we use as a filling, if capillary tubes exist between tooth substance and filling. An artificial crown, in many cases, is far superior to a contour filling. We should compare notes oftener, specially when dentists happen to be in our offices. We should not be afraid of radicals nor extremists. It is impossible to save teeth which are in contact at the cervical walls, even the filling of one tooth should not be allowed to come in contact with the surface of its proximate tooth there. Teeth here should be cut square. Some that I filled in this way twenty-five years ago are still preserving the teeth. I resorted to the contour method, when the principle itself was not known. Since I went into anticipation, I have counteracted decay which would be impossible to treat, except by contour. I insist on children coming to me from time to time; anticipation will be successful only when children are seen from four years of age up. If decay has begun, there will not be so much chance of success. I have found many cavities in this way, in which it was impossible to practice anticipation, or even simple filling. Two-thirds of the operations of anticipation on molars and bicuspids, save them without any filling. Seven-eighths of those saved are incisors and cuspids.

Saving Teeth.—It is, and should be, the aim of dentistry to preserve the natural teeth. But the popular idea of the business of a dentist is that he was created for the special purpose of extracting teeth and hurting people; and, unfortunately, this idea is the result of the practice of the average dentist in the past, and many below the average in the present, who would no more think it possible to save an aching tooth than to raise a man from the dead.

"Pull 'er out," is the too general advice, and too frequently a dozen others go with it to be replaced by a set of artificial teeth the rest of the natural life.—*Health and Home.*

The Mississippi Dental Association, we should judge from the local paper sent us, had quite a successful and harmonious session last August.

USE OXYPHOSPHATES.

DR. G. CHISHOLM.

After four or five years of close observation, I have arrived at the conclusion that oxy-phosphate is one of the most useful materials in operative dentistry.

I will give my method of treating such teeth, and I claim for it almost entire success. I am indebted to Dr. J. S. King, of Pittsburg, Pa., for my first steps in this direction, and have proofs of its efficiency in my own mouth—work done by him twelve years ago. In all cases of exposed nerve, I make a paste of pure wood creosote and white oxide of zinc, or of prepared chalk, which I consider answers the same purpose, [and better.—Ed. ITEMS.] The paste I flow gently over the nerve, and cover with a soft paste of oxy-phosphate. Where the pulp is inflamed by long exposure, or other causes, or where it is nearly exposed, and I do not care to expose it entirely, I use a preparation of permanganate of potassa, about one grain to a drachm of water. Saturate a small piece of cotton or bibulous paper with the potassa, and place it in the cavity, allowing it to remain one or two minutes; then thoroughly dry the cavity, and proceed to fill as above stated. The oxy-phosphate I find to be the best capping for the creosote paste. It is non-irritant, equally as easily applied, harder, and resists the action of the fluids of the mouth better than oxy-chloride or any other material I have used. As a filling for frail teeth, where I do not wish to use gold; as a temporary filling for deciduous teeth; as a lining for cavities where amalgam is to be used, I have found nothing superior or equal to oxy-phosphate.—*Southern Dental Journal.*

Dentistry as a Trade.—If we are determined to practice dentistry as a trade, then there is no hope. It is only as a profession we should lend our talents to curtail the miseries of the race by giving them such dental organs as will insure better physical organizations. This need not prevent us from charging for time and talent for anticipating trouble, rather than allow the shores to be strewn with hopeless wrecks. Shall we be equal to the emergency, and pledge ourselves to this holy war and take hold of any plan, come from whence it may?—W. G. A. BONWILL.

The Standard for Artificial Teeth.—Dr. K. B. Davis says: "Artificial teeth may serve for mastication, yet be defective in other respects, as in speech or in expression, which depends on color, size, position, and relative arrangement. Temperament, including complexion, contour of face and general cast of features must all be considered in the construction of a set of artificial teeth that shall harmonize with the other features of the face, and constitute a successful work of rt."

RUBBER DISKS.

"Will some one please give, in the next ITEMS, the process of uniting vulcanite and emery so as to vulcanize into a solid mass?—QUIZ."

You will find whalebone rubber best as it is softer and more adhesive when heated to the proper temperature. Corundum powder, of number 100, is a good size to use. The only tools needed are a marble slab and a round bottle. First heat the slab to about 180° F.—to judge the temperature, without the use of a thermometer, the sense of touch will do, as the heat should be as great as can be borne by the naked hand.

Place the heated slab on a table and place on it a small quantity of the powdered corundum, say ½ oz.; spread over a surface as great as the rubber into which you wish to incorporate it.

Take a strip of rubber, half an inch wide, and two and a half inches long, and place on the powder; now roll the mass, turning the rubber from time to time, till the area of the rubber is twice as great as the original; double the piece so as to bring the powder into the interior, then roll out till the thickness is about No. 20 of the U. S. Gauge Plate. This mass will be sufficient to make half a dozen disks of No. 23, U. S. Gauge Plate, and seven-eighths of an inch in diameter. The powder should be worked in till the mass is three times the weight of the rubber used.

If "QUIZ" has the Missouri *Dental Journal* for 1880, and will turn to page 77, he will find more on the subject.

ST. LOUIS. JOHN G. HARPER, D. D. S.

The popular term, "germs," which has attained such prominence in our language, is destined to become as familiar as household words. It is used to designate the members of a low order of life which are supposed to be the cause of a great many of our diseases. There is a growing belief among the most eminent physicians of all countries that contagious and epidemic disease—such as scarlet fever, cholera, yellow fever, diphtheria, and many others—are caused by the presence of these so called "germs," which enter the blood of the one affected, and then multiply to countless numbers. And it is highly probable this view will become established.—*Southern Journal of Health.*

If a dentist learns the component parts of an amalgam he thinks he can make it, and rarely takes the trouble to find that he cannot till his fillings begin to fail, when, as a rule, he blames the recipe and flies to another unknown alloy which he has not learnt how to use, and so the trouble goes on, the amalgam, as usual, getting all the blame which rightly should be given to the operator.—THOMAS FLETCHER.

EXTRACTING TEETH WITH BUT LITTLE PAIN.

Editor ITEMS:—

I have followed the directions of the article found in your journal and headed as above, with success—that is, so far as extracting teeth is concerned. But patients complained bitterly of the effect the fluid had on the cheek and the gums till I devised a means of keeping it from touching them. Now the whole process is a perfect success. It is worth a year's subscription to your journal. Let me repeat it, adding my caution to prevent injuring adjacent parts:

Tincture aconite, chloroform, and alcohol of each one ounce; morphine 6 grains; mix and shake well. Moisten 2 pledgets of cotton with the liquid, and apply to the gums on the sides of the tooth to be extracted, holding them to their place for about five minutes. This is invaluable to relieve the pain, partially at least. A folded napkin should be used to prevent the liquid from becoming diluted, and to prevent its injurious effect on the cheek and tongue. The patient should be cautioned not to swallow during its use. I have used it very many times for all ages; so far none has been swallowed. Should it ever happen I should give a syrup of ipecac.

BENJAMIN F. WRIGHT.

Sore Mouth Under Plates.—Dr. G. V. Black says: "The subject of sore mouths found under rubber plates should be further investigated. This condition has been attributed to the coloring matter of red rubber plates, but it appears under metal and porcelain plates also. A partial study of the causes of this disease has led to the discovery of leucocytes and micro-organisms under plates. In examining scrapings from plates and gums I have been surprised at the abundance of these organisms. If more abundant under rubber than under metal or porcelain plates, I am disposed to attribute the fact to the rougher surfaces of the rubber plates, which afforded greater facilities for the lodgment of foreign substances of a nature favorable to the growth of the organisms. Wandering cells—leucocytes—were seen constantly changing forms, micrococci aggregating around and among them. The wandering cells take up and digest the micrococci and thus aid in preventing the increase of the latter. Cleanliness is the chief preventive. The condition described differs from that of mercurial poisoning. I do not regard the coloring matter injurious. The temperature of the tissues under a plate of non-conducting material varies from the normal less than one degree. Plates are not cleansed frequently enough.

Tennessee Board of Health.—Their July report is just received and interests us much. If every State would take as much pains to inform the people as Tennessee and have a health board as efficient we should certainly be a healthier nation.

A GOOD TOOTH-PICK.

DR. H. PARKER.

Reduce a half-dollar with the rolling-mill to a plate the thickness of a No. 1 separating file, cut strips from this one inch and a-half long, and from one-sixth to one-fourth inch wide, as you wish the width of pick. Elongate eaeh end by passing it (or 1-10 inch of the end) in and out of the mill, back and forward, until it has the desired thinness to pass readily between the teeth. Cut off the thin ends till about one-third of an inch long, and round up the ends and sides on a stone in lathe. That it may have the desired stiffness when done, anneal but once; the best time is when the half-dollar is reduced to half its thickness. They may be made of gold plate in the same manner. The teeth in most cases, will move in their sockets sufficiently to let the pick push all food from between them. This tooth-pick is preferred, by all who have used them, to any other.—*Southern Dental Journal.*

Teeth formation.—Dr. J. J. R. Patrick hands the following to the members of his class to be memorized:

Teeth are developed like bone, the hardening salts in both cases are deposited in pre-formed cells or cavities, organized in a pre-existing mould or matrix of animal matter; but they differ in the direction of the deposit, which in bone is from the center to the circumference, in tooth from the circumference to the center; the process of calcification in bones is centrifugal, in teeth centripetal.

Where a succession of teeth are required, as in mammals, and many fishes (notably in sharks) the process of formation is by conversion of, instead of transudation from, a pre-existing pulp, and a successive formation of these pulps necessarily follows where a succession of teeth are required.

In teeth where the pulps are persistent as in the tusks of the elephant, the boar and the walrus, and the incisors of all rodents, the formative process is by transudation from, and not by conversion of, the pre-existing pulps, for such teeth are unlimited in their growth, and the pulps are always found in a full progressive activity up to the time of the animal's death, and such teeth are not preceded by deciduous teeth.—*Archives of Dentistry.*

Setting Bonwill Crowns.—Dr. H. K. Leech, of Philadelphia says: I have had my best successes lately with the Bonwill crown. The failures I formerly encountered with it were, I think, in a measure my own fault. My greatest fault had been in using the amalgam too stiff. If you get the crown nicely adapted to the root, there will be no rocking, —an important gain, and one which will have very much to do wit

the final success of the operation. The labial portion of the crown should be carried as far under the gum as possible. The amalgam should be mixed rather soft; put some in the root; run an instrument up first, and then the pin, and see that it is firmly secured. Now try the crown on, and see if it is correct. Then put in more amalgam, packing it well in the root and around the pin; put some amalgam in the crown and push it well to place; and, finally, caution the patient to be careful of the tooth for a while, till the amalgam is firmly set. Proceeding in this way, you will find the operation permanent. If you have the amalgam very stiff in the root, the amalgam in the crown will not join, but there will be a line of demarkation, and you will have nothing but the pin to depend on; but if the amalgam is mixed soft, and carefully worked in the canal, so that there is one solid mass of amalgam in the root and in the crown, you will have a firm piece of work, even if the pin breaks.

Nourishing the Tissues of the Teeth.—Dr. Frank Abbott says: For a number of years past I have entertained the views that there was some difficulty existing not due to an insufficiency of lime-salts, which occasions so many faulty and imperfectly formed teeth. With that idea in view I have advised exercise in the open air and other kinds of treatment for some patients which would favorably affect their digestion. That the food ordinarily taken contains sufficient lime-salts to form and to sustain the teeth I have no doubt (except in cases of extreme anemia, during gestation and lactation). I believe the fault is beyond that. There is a lack of proper nourishment of the tissues, due to imperfect digestion, which depends again on the proper "nerve tone." I believe this to be the real cause of the difficulty. It is reasonable to suppose that any *tonic*, whether taken in the form of exercise in the open air, or in any other form, which affects favorably other portions of the body, will affect the teeth favorably as well. When we have *ascertained the functions of the great nerve-centers*, and those functions are assured, then we will probably have more perfectly-formed teeth.

Changes in Practice.—It seems singular sometimes to note the landmarks of time in dentistry. One of the most curious of these is, that the inventor of the electric mallet has become a most pronounced advocate of amalgam. Another, and one which is most significant and striking, is the rebound from the decorative abuse of gold in favor of plastic material. Two or three in my office, who have worked themselves to exhaustion in the excessive use of gold, have now found

in amalgam and other plastics their friend; and that they with others, can save the teeth by processes which are more eclectic. I have removed remnants of gutta-percha fillings which have been in cavities for ten or twelve years. I don't yet admire cohesive gold as many do; I happen to know a great many cases of "soft" gold fillings which have been doing good service for thirty or forty years. Years ago I commenced the practice of filling on the cervical margins of gold fillings with amalgam, and deprecate the practice of removing old fillings merely because there is slight decay or imperfection at these points. I have no ambition to pull work to pieces because I may start a better filling.—D. NEAL.

Extremes Beget Extremes.—Dr. James Truman says: "The natural result of the practice and teaching of men who confine their operations to the use of gold, is to create an opposition party who do not use it at all, but go to the other extreme and use plastics only." He thinks both are wrong, and that a certain conservatism should be both taught and practiced. He is convinced from what he saw and heard during his residence abroad, that the teachings of the "New Departurists" had done great harm there, and, he had no doubt, an equally bad effect would be felt here.

Reflex Action.—Dr. Spalding says: Reflex action often occurs independent of the will or even of the brain. There are other nervous centers besides the brain, and reflex action may be referred to subsidiary nervous centers. The eye may wink as an involuntary act before the will becomes cognizant of danger to that organ. There is a common idea that there exists somewhere in the body a life center—a place, or an organ, where life specially resides. I apprehend that life pervades the entire body, that every organ receives life of a degree corresponding to its importance. If life did not pervade the whole body, how could the body in all its parts be under control?

That mercurial poisoning may occur in some cases where plugs are made with the grossest carelessness and an immense excess of uncombined mercury, may be possible, though I have never once, in twenty years' practice, seen such a case; but this, even if it does occur, is a proof, not that amalgam *per se* is in fault, but that the dentist does not understand the material he is using. Any dentist, who puts in a plug saturated with uncombined mercury, had better discontinue using all amalgams till his education becomes more complete.—THOMAS FLETCHER.

The evils of intoxicating drinks is the subject of a pamphlet received from the Society of Friends of Philadelphia. How uniformly these Friends are right in every great moral question.

NONE-MERCURIAL RUBBER.

I have been using a new rubber prepared by Henry Junge, 335 Broadway, New York. Its chief merit is in the fact that it contains no mercury, and yet is not black. It is a dark brown, and very tough. If a patient must have a *non-conducting* material in the mouth, why, this is the best thing I have seen, using, of course, the pink rubber for gums, if they show.

L. P. HASKELL.

MORE BIG MOUTHS.

I have the casts of two large mouths. One measures three inches across, and from the front back through the center two and-a-half inches; the other measures three inches and a-half across, and from back through the center three inches.

The former is the mouth of a colored woman, the latter that of an English woman resident in South America. This is an extraordinary sized mouth, for a *white* woman. Can anyone beat it?

If there are any other reports of big mouths to record I trust the measurements will be made as accurate as possible and thus prevent the likelihood of the "big mouth" correspondence developing into "Snake Stories."

D. TAYLOR.

PORT JERVIS, N. Y., Sept. 9, 1885.

RATHER "TOOTH-SOME."

BY ROBERT BURDETT.

WHEN THE 1ST 2TH COMES 4TH.

Oh, lively snag, my dreams are all of thee,
And all my waking thoughts to thee are turned;
Thou art my jawsy, aching uncrowned, to me,
An altar where my Frank incense is burned.
Sometimes in peace thou sleepest sweetly—ah!
What charm is there! And then thou wak'st—Hoop la!

I can no more endure thy tyrannous vein,
How dust thou grind the sad face of the poor!
Thou givest no relief, thou art ever payin',
Thou murderous fang, of torrid temperature.
Out of my eating thing thy form I'll thrust
Peaceably if I can, forcibly if I must.

"I tell you, sir," said Dr. ——— one morning to the village apothecary. "I tell you, sir, the *vox populi* should not—must not be disregarded." "What, Doctor!" exclaimed the apothecary, rubbing his hands, "You don't say that's broken out in town too, has it? Lord help us! What unhealthy times these are!"

For sensitive teeth Dr. Frank Abbott uses bicarbonate of soda.

PHOSPHATE IN MENDING CASTS AND SETTING CROWNS.

Editor ITEMS:

You may tell "G," of September ITEM, to use Welch's Phosphate of Zinc for mending broken casts. It is the only satisfactory material I have found, and I have tried everything recommended. I mix it not much thicker than cream; spread it over one surface and press the other piece quickly to its place. The plaster need not be specially dry—five or ten minutes after removing the model will do. Other phosphates that I have tried crumble and roll on the plaster.

I think with Dr. Darby that a broken tooth cut down and replaced with a porcelain crown, is safe, good, and durable. For beauty and comfort, as well as for cheapness it cannot be excelled by any other method of filling or replacement.

A young lawyer of this city called on me last week with two little "pegs" instead of superior laterals. He thought of having them cut. I dressed off the labial surfaces and a little of the points, and fitted platinum bands, then soldered crowns on the bands, using pure gold solder, flowing it completely over the bands. I drove the crown home after putting in Welch's Phosphate. The crown was a success and the lawyer was delighted.

A. W. SPALDING, D. D. S.

TORONTO, Ontario.

The fibrillar arrangement in healthy human enamel, Dr. Bödecker thinks, is clearly demonstrable. Basing his conclusions on the examination of thin sections, stained with chloride of gold, he believes that the enamel is built of columns of calcified substance, between which minute spaces exist. These are filled by a material which takes the stain deeply, and is probably analogous to the cement of epithelial formations. As seen in the sections, it gives off exceedingly fine thorns, which apparently pierce the prisms at right angles to their length, so that it forms a close net work intimately mixed with the calcified portion of the enamel.

This peculiar cement in the tubes, Dr. Bödecker—from his investigations—thinks is not of uniform consistency, and is of far greater importance than to act simply as a cement. He believes it renders the enamel much more "alive" than it has been heretofore considered, and that it is continuous with the contents of the dentinal tubes through the medium of large masses of protoplasmic substance found at the margin of the enamel and dentine.

I am anxious that families of my patients should be awakened to a sense of their duties to their children's teeth. I see no better way than to circulate such literature as "Mother to Mothers."

EUFALA, Ala. S. G. ROBERTSON.

Editorial.

RINGS OF TREES AS MARKS OF AGE.

A writer says a cedar felled in California recently proves to be over four thousand years old. He estimates its age by counting one year for each ring in its trunk. We see that an examination of the trunks of some trees cut from off a celebrated Indian mound in the West, a short time since, gives by this manner of computing the rings, a very great age to the mound builders.

This is an hypothesis of computation so old, and so almost universal, it is difficult to convince many really intelligent people of its falsity. Yet proof of its utter untrustworthiness is easily established. Trees are continually being cut down which were planted at known dates. Why does it not occur to those who rest in the theory that each ring of a tree represents a year, to count these rings and compare their number with the known time of the tree's life? They would find some of the rings quite indistinct, others clearly marked; some quite closely set, others farther apart; and in probably every instance, there would be a great many more rings than years.

We are told that the irregularity of the rings is caused by the difference in the character of the seasons, the indistinct and closely set rings indicating the small growth of some years, on account of drouth, the more distinct marks with more wood between, being evidence of a warm, moist season of rapid growth. One investigator however, thinks he has demonstrated there may be sometimes two rings for each year, showing the spring and the fall growth, specially if a drouth intervenes. Others think these couplets of rings are usual, and show that two should be counted for each year. But even doubling the rings for the years give too many years. Cut down a pine or a hemlock which has grown on some earthwork since the late war, and count the rings. Estimating each ring for a year would carry the Rebellion back almost to the Revolution.

Appropos to the above, we find the following in the *Popular Science News*, published in Boston:

"During a visit to the ruins of Palenque, Mexico, in 1859, M. Charnay caused all the trees that hid the facade of one of the pyramids of the palace to be cut down. On a second visit in 1880, he cut the trees that had grown since 1859; and he remarked that all of them had a number of circles greatly more numerous than their age would warrant, supposing one circle only to be added annually. The oldest could only have been twenty-two years of age, but on a section of one of them he counted two hundred and fifty circles. The tree was about

two feet in diameter. A shrub not more than eighteen months old had eighteen concentric circles. M. Charnay found the case repeated in every species, and in trees of all sizes. He concluded that in hot and moist climates, where nature is never at rest, trees may produce, not one circle in a year, but one in a month. The age of a monument has often been calculated from that of trees that have grown on their ruins. For Palenque seventeen hundred years had been calculated, seventeen hundred rings having been counted on a tree. These observations, however, require the number to be cut down to one hundred and fifty or two hundred years."

THE VICE OF SPELLING.

When we consider the time required to learn to spell, the hindrance it is to the acquirement of reading, the stumbling block it is to the study of everything useful, and the severe strain it is to the tender intellect, it may well be called a drag instead of a help, a nuisance instead of a blessing, a vice instead of a virtue.

English spelling is one of the worst time-wasting, soul-perplexing, mind-stunting processes which forms a part of the general education of any people. It cannot be reduced to principles; it is entirely void of system; there is no device by which it can be reduced to form or comliness—it is simply a loose jargon of letters thrown about promiscuously—no rules to govern them—no reasons to explain them—no sense to relieve them from utter condemnation.

A good speller, in the popular meaning of that term, is simply a person of good memory, who has stowed away a multitude of different shaped blocks and knows where to find each as it is wanted. He need not be a logician, a philosopher, or a scholar of any kind. Because spelling is so absurd, so inconsistent, and so nonsensical, our best thinkers are often poor spellers. Their time is too precious to give sufficient attention to such a mixture of foolishness, absurdities, and contradictions.

It takes the English three times as long to spell as it does the German and the Italian, and it takes these three times as long to learn their orthographies as it would if they were phonetic.

Our English spelling is getting no better. We are lopping off a letter here and there, but we are almost monthly adding professional and other words which, to spell, tax the uninitiated quite as severely as any of the old words. Unless there can be a reform, the present arbitrary, loose and haphazard way of spelling is sure to grow worse and worse.

It is true, we have not letters enough to spell phonetically, but we do not properly use the letters we have. Very many steps in the direction of simplicity could be taken without going outside our pre-

sent insufficient alphabet. In fact, we do not spell as well with twenty-six letters as our forefathers did with sixteen. We should only have to add sixteen more to use a letter for every sound; but instead of doing this, we make no effort to spell well; we even laugh at those who do, and intrench ourselves behind all manner of subterfuges to confirm ourselves in our folly.

Really, it seems sometimes as though the more letters we can get in a word, and the more heterogeneously we can mix them up, the better we like it. A mere untutored child spells better than a lexicographer. Truly, our spelling has become more than a folly, it is a vice.

WHAT DOES YOUR SOUL WEIGH?

There are persons whose soul—if we may judge its size by their selfish, contemptible, miserly mold; by their small, pernicious, pusillanimous transactions; by their low, narrow, short-sighted views,—if put in the balance would be found too light for the smallest weight. In fact, it would be difficult to find it, and, if found, to handle it. If, by any means, it was brought to light, and picked up for microscopic investigation, the miserable, shrivelled, contemptible thing would be thrown away in disgust.

We really believe some have a soul as big as the body; its possibilities and capacities and powers reach far beyond their body and almost fills the world, if, indeed, the world is quite big enough to contain it. The very beginnings of their great thoughts, the very inceptions of their vast views, the very broodings of their mighty aspirations, make their heart beat like a great engine, and tax their brain and nerves and muscles,—yes, their whole frame, till they feel quite incapacitated for the work demanded. The mind would like to burst its narrow limits, and the soul chafes as the small body hinders its celestial flight.

It is not the size of the body that counts—it is the weight of the soul; it is not the mere animal powers that give us importance—it is the force sent out by the living being within; it is not the accumulation of wealth, the attainment of honor, and the applause of men that show our worth—it is the culture, maturity, and breadth of the immortal self. Our physical height and breadth and weight may be immense, yet it is by the capacity, the inspiration, and the deeds of the soul we are truly estimated. Of what value are our seed thoughts?—with what dilligence do we cultivate them?—what fruit do they bring forth. What light and warmth are brought to this dark world by our tread through it?—what power have we to regenerate it?—what intellectual and moral and spiritual wealth have we to give it?

Estimated by this standard, strong men may be very weak, and weak men very strong; large men may be very small, and small men

very large ; weighty men may be very light, and light men very weighty ; tall men may be very short, and short men very tall.

> " Were I so tall to reach the pole,
> Or grasp the ocean with a span,
> I should be measured by my soul ;
> The mind's the standard of the man."

"THE SKIN OF THE TEETH."

Is to speak of the "skin of the teeth" a new thing under the sun? No ; it is an expression very ancient ; even Job refers to it. The teeth would have a sorry expression without it. What beauty would the face have without its cuticle? So it is this which gives to these beautiful rows of living pearls a smile—it makes them laugh. Destroy their skin, as it is sometimes destroyed by disease, and they are like the eye without its luster, and like the face all pitted with small-pox ; yes, worse than these :—they are as expressionless as death.

Anciently "the skin of the teeth" was thought to be a figure of speech ; but many years ago Nasmyth proved it to be a veritable membrane. Since then this dental cuticle has been known as "Nasmyth's membrane." And yet it is hardly a membrane ; it is too hard, too structurless, and too void of vitality. It is almost too thin to obstruct the light, and too transparent to hide the enamel beneath. It is the toughest and yet the thinnest, the strongest and yet the least fibrillous, the most durable and yet the least organized skin of any organ of the body. In fact, it has no fibers, no membranous structure, no organization. It is a veritable cement, and yet a cement so thin as to be a mere varnish. It is capable of being scaled off by first applying a strong acid, and yet in its normal state, it is so hard that, on being scraped, it turns the edge of the best tempered instrument. Under ordinary circumstances it is indestructible.

Convoying.—In the *Cosmos* report of the American Dental Association occurs this sentence : "Between the sessions they (the dentists of Minneapolis) busied themselves in convoying small parties to the different points of interest around the city. "Those points" must have been very dangerous. But was not this very kind of these dentists? It is a pity the innocent, unsophisticated and weak ones, who stray from their little Edens in the east, should not always find strong, experienced, and virtuous fellows in the west ready to *convoy* them through the treacherous labyrinths of wickedness found there.

Mix thought with your labor ; then you will advance it wonderfully, and it will advance you.

TERMS WITH REFERENCE TO THE SURFACES AND ASPECTS OF TEETH.

The teeth of one jaw are *apposite* to those of the other jaw. For instance, we say the face, or *grinding surface*, of each tooth in one jaw is so placed that it is apposed (or adapted) to the face of two in the other, or apposing jaw. This is much better than to say (as in some dental works) that they are opposed to each other, for this gives the idea of antagonism.

When the surface of one tooth strikes the surface of an apposing tooth it *occludes*. The teeth occlude, therefore, when they come together.

The back teeth—molars and bicuspids—are *posterior* teeth; the front teeth—the cuspids and incisors, are *anterior* teeth. The latter are also sometimes called *oral* teeth, because they are used in articulating speech.

The upper teeth are sometimes called *superior*, and the lower *inferior;* we prefer to call them simply *upper* and *lower*—not upper and under, because then in referring to them by the first letter, as we sometimes find it convenient, it does not designate which. Superior and inferior are not proper terms, because the upper teeth are not superior or better than the lower, and the lower are not inferior or worse than the upper.

The apposing faces of the posterior teeth are called *grinding surfaces;* in the anterior teeth they are called *cutting edges*. When the jaws are brought together only the posterior teeth occlude, unless the lower (not under) jaw is brought forward; then only the anterior teeth occlude, and generally but one or two of them.

The *proximal* (contiguous) surface of a tooth is that which faces another tooth. The anterior proximal surface is that facing the tooth immediately in front; the posterior proximal surface is that facing the tooth behind. If a tooth is not immediately contiguous to another it can have no proximal surface. The term can only apply where two teeth come together, or very nearly so; so that every *anterior* proximal surface must have, apposing it, a *posterior* proximal surface, and every *posterior* proximal surface must have apposing it, an *anterior* proximal surface. Some call these *ap*-proximal surfaces. If this term has any different meaning than proximal it is that of *approaching* instead of *proximity*, an idea not relevant to our purposes, for we are referring to proximal or contiguous surfaces, and not to surfaces which are *approaching* each other. They are sometimes called *interstitial* surfaces.

The jaw is supposed to have a *median line;* that is a line running through the middle, dividing it in right and left halves. It also has a right and left distant extremity. The surface of a tooth looking front

toward this median line, as it divides the alveolus, is the *median aspect.* The face, looking toward one of the distant extremities, is its *distal aspect,* or surface.

The inner surface of a tooth is its lingual aspect, because it is facing the tongue. The surface of the anterior or front teeth, toward the lips, is their labial surface. The outward surface of the posterior or back teeth—the bicuspids and molars—is their bucal, or cheek surface or aspect. The inner surface of the upper teeth is sometimes termed their *palatile surface,* because this aspect faces the roof or *palatine surfacc* of the mouth.

The *cirvical* border of a cavity is that next to the gum, specially in the proximal surface of a tooth. The general border of the tooth near the gum is called its gingival border.

On the lingual surface of the incisors there is a ridge near the gum called the *basal ridge,* which by some is called the *cingulum,*—or girdle. This is a very proper term for this ledge in the teeth of some animals, for it constitutes a girdle. In man it is only a ledge across the lingual surface, and therefore not really a cingulum. On this ridge is sometimes a cusp and on each side are small, abnormal depressions which becomes the seat of caries.

DRILLING INTO THE ANTRUM.

We were in a dental office a time since when the dentist called our attention to "the great length of the root of a second bicuspid" he was attempting to drill through. "See," said he, "the length this root must have ; I am trying to reach an alveolar abscess on its apex, and I have already gone three fourths of an inch ! " Taking a longer needle made into a drill, he said he was bound to find it anyway ; and he soon found it—that is, the antrum—when he exclaimed "There, now I am satisfied! Now I can cure the abscess ! It is only for me to reach one to knock it, sure." There was no use of my trying to convince him he had penetrated the floor of the antrum and was now about to force his poison into that cavity.

DIED IN THE DENTIST'S CHAIR.

The Dental Luminary says Mrs. Fannie McWhorter died suddenly in the dentist's chair lately. Of course she was taking gas, and the gas was the cause of her death. No; she was taking no gas, nor ether, nor chloroform. She had taken nothing. But, did the mere extracting of her tooth cause death? No ; she was *only going to have* a tooth out. She died simply of fright.

My ! what a terrible warning against gas, or ether, or chloroform this would have been, if the dentist had began—even *began*—administering either of these anæsthetics!

THE LIME IN TEETH.

A writer in one of our magazines says, "A tooth is but a lump of chalk"—a form of lime. The importance some of our professional writers attach to "feeding teeth with the salts of lime" gives the same impression. By this continual harping on lime we might suppose, if we did not eat it as freely as chickens do our whole bony structure would fall to pieces.

We are inclined to think there are few articles of diet within our reach so destitute of lime as not to be "good for food." The very water is impregnated with it, not "only in a few favored regions," but everywhere; in some sections in such excess that, without its precipitation, the water is neither good for drinking nor for domestic use.

The tooth does not depend on its lime either for strength or durability. Of course, without lime it would not be; but, unless that lime—each particle of it—was intimately and strongly bound with the peculiar animal net-work, running through every minute part, and by that mysteriously resisting, persistent and almost impenetrable and indestructible cement which glues every particle, and covers the surface of the tooth—even the enamel—with a vitreous skin, the lime would be of little use. This is what makes the tooth last, not only through life (with proper treatment) but so long after death that when all other bones are eaten by the rapacious tooth of time, this monument is left to tell almost the name of the possessor.

How absurd to speak of a tooth being "but a lump of chalk" when this carbonate of lime constitutes but a three-hundredth part of it! The phosphate is much more abundant, constituting nearly sixty per cent. of its substance. But though these two limes largely predominate, the twenty-eight per cent. of animal ingredients are far more essential in giving to the tooth usefulness and durability. As well may we give prominence to the water of our body, because it constitutes more than three-fourths of its weight, as to speak of a tooth being "but a lump of chalk." Even the water in a tooth is a sixth as much as its lime, yet, of what potency is the water? Neither would be of use without the cementing, binding, hardening, organizing, living, indestructible effect of the animal substance.

In a diseased tooth the trouble is not with defective lime but with faulty matrix—the organic substance; and in a soft, disintegrating, "chalky tooth" the difficulty is in the defect or loss of cement, not a deficiency of lime.

We suppose Ashville, N. C., is one of the healthiest cities in the United States. In fact, the whole mountain region in this vicinity is noted for salubrity and healthfulness.

ERRORS IN COMPOSITION.

REDUNDANCY.

In two or three articles on composition we have shown how many prefixes, and sometimes whole words are redundant. Frequently phrases and even sentences are useless. Allowance must be made for difference in style, but seldom superfluous words add strength to any class of composition. We would all like to write acceptably. By having our attention drawn to common errors we shall be able to avoid them. In writing, very many errors will be avoided by first having a distinct thought, and then being satisfied to express it in the fewest, plainest words possible. After becoming master of a pure style, if we chose sometimes to assume a florid, rhetorical style, this will give pleasant variety; but even then, every word must have a dis. tinct, appropriate meaning, and each sentence glisten with some golden thought.

As a lesson in general redundancy, and some other errors in composition, we will take a part of the first chapter of *Tomes' Dental Anatomy*. This will give us an interesting lesson on the teeth, and at the same time show us how a good scholar, and popular English writer, can err in his choice of language; or rather, perhaps, how some really ripe scholars clothe their thoughts carelessly. It is the minority of even our popular authors who write tersely. Do not let it be supposed we consider our writing a standard of style. It is our own clumsiness in composition that leads us to the study of a pure style; and we presume there are few writers, who, if they were to critically review their own writing, would not be astonished at its redundancy and its many other errors.

It pays well to study thoroughly the art of composition. We are all too loose in our use of words to express our ideas. *Italics* show the change of a word.

In the following example, it will be seen we not only omit many words, but change some words, and add a few. In fact, we just suppose it an article sent us for the ITEMS. The first column shows it as received; the second, as corrected. We may have taken too great liberty in our corrections. Each reader shall judge for himself.

THE range of the subject of Dental Anatomy turns upon the meaning which is attached to the word "Tooth;" but, although this chapter might most appropriately open with a definition of this word, it is very much easier to explain what is ordinarily understood by it than to frame any single sentence which shall fulfill the requirements of logical definition. Most vertebrate and a great many invertebrate animals have certain hard masses in or near to the orifice of the alimentary canal, *i. e.*, the mouth; by these hard masses, sometimes of bony and sometimes of horny nature, various offices in connection with the prehension or comminution of food are per-

THE range of Dental Anatomy tnrns on the meaning attached to the word "Tooth:" but, though this chapter might appropriately open with a definition of this word, it is easier to explain what is ordinarily understood by it than to frame a sentence fulfilling it. Most vertebrate, and many invertebrate, animals have certain hard masses in or near the mouth, called teeth; these are sometimes of bony and sometimes of horny nature. They are for the prehension or the comminution of food.

formed, and to them the term "teeth" is applied.

The subject of the homologies of the teeth cannot be fully entered upon until the details of their development have been mastered; still a few words may even at the outset be devoted to the elucidation of their real nature.

* * * * * *

Teeth owe their hardness to an impregnation with salts of lime; the organic matrix may be of albuminoid character, in which case the tooth is of horny consistence, and is spoken of as "cornified;" or the matrix may be like that of bone, gelatigenous, in which case the tooth is more richly impregnated with salts, and is spoken of as "calcified."

The great mass of a calcified tooth is usually made up of "dentine," which gives to it its characteristic form, and often practically constitutes the whole tooth; to this may or may not be added enamel and cementum.

Without further prelude we may pass to a description of the human teeth, this course appearing to me, after some little consideration, to afford to the student the most advantageous introduction to the subject, as he must necessarily already possess some knowledge of their forms, while to the matters alluded to in the preceding pages more full reference will be made hereafter.

In the human subject no tooth rises above the level of its fellows, and the teeth are arranged in close contact, with no interspaces between them. The teeth are ranged around the margins of the jaws in a parabolic curve, or something approximating to one; in the lower races of mankind the curve tends to a squarish, oblong form, owing to the prominence of the canines (compare the figure of the dentition of Simia Satyrne), whilst a deviation in the opposite direction is daily becoming more common in the most highly civilized races, resulting in a contour to which in extreme cases the name of V-shaped maxilla is applied.

It may be stated, as generally true, that the teeth are somewhat larger on their labial than on their lingual aspect, a result which necessarily follows from their standing without interspaces along a curved line. And as great variations in size and shape, as well as in colour, are found to exist between different individuals, it is only possible to give such a description as shall apply to the generality of teeth.

The teeth of the upper jaw are ranged along a curve of larger dimensions than those of the lower, the incisors passing in front of the corresponding lower teeth, and the external cusps of the bicuspids and molars closing outside those of the lower teeth.

There are, however, some points of detail to be noted in the relation borne by the upper to the lower teeth, besides that comprised in the general statement that the former lie outside the latter, by which it is brought about that each tooth is antagonised by portions of two teeth in the other jaw, and has not only a single opponent.

The upper incisors and canines, when the mouth is closed, from the larger size of the arch in which they are arranged, shut over and in front of the lower teeth, concealing the upper thirds of their crowns; while the external tubercles of the bicuspids and molars of the lower jaw are received into the depressions between the external and internal tubercles of the similar teeth in the upper jaw, thus allowing the external tubercle of the upper teeth to close externally to the outer tubercles of the lower row.

From this arrangement of the tubercles, we are enabled in mastication to use the whole surface of the crowns of the opposing teeth; the act of mastication being performed by bringing the external tubercles of the under molars opposite to those of the upper row: whence, by the lateral motion of the under jaw inwards, their

We will not enter on the *correspondence* of teeth till the details of their development have been considered; still a few words, even now, may be devoted to the elucidation of their real nature.

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Teeth owe their hardness to an impregnation with salts of lime; the organic matrix may be albuminoid, then the tooth is cornified or horny; or the matrix may be *gelatinous* like bone, then the tooth is more richly impregnated with *lime* and is spoken of as "calcified."

A calcified tooth is usually "dentine," which gives to it its characteristic form, and often constitutes the whole tooth: to this may or may not be added enamel and *cement.*

Without further *premise* we pass to a description of the human teeth. This affords the student the most advantageous introduction to the subject, as he probably already possesses some knowledge of their forms.

In man no tooth rises above the level of its fellows, and the teeth are arranged in contact round the margins of the jaws in a curve.

In the lower races the curve tends to an oblong form, owing to the prominence of the cuspids, while a deviation in the opposite direction is becoming more common with the most highly civilized, tending to a V-shaped maxilla.

The teeth are larger on their labial than on their lingual aspect, caused by their standing without interspaces along a curved line. As great variations in size, shape, and color, are found, it is only possible to give such a description as *will* apply to the generality of teeth.

The teeth of the upper jaw are ranged along a larger curve than those of the lower, the incisors passing in front of the corresponding lower tooth, the external cusps of the bicuspids and molars closing outside the cusps of the lower teeth; also, each tooth is *apposed* to portions of two teeth in the other jaw.

From the larger size of the arch in which they are arranged, the upper incisors and cuspids, when the mouth is closed, shut over and in front of the lower teeth, concealing a third of their crowns; while the outer *cusps* of the bicuspids and molars of the lower jaw are received into the depressions between the outer and inner *cusps* of the similar teeth in the upper jaw, thus allowing the outer *cusps* of the upper teeth to close externally to the outer *cusps* of the lower row.

From this arrangement of the *cusps* we masticate on the whole surface of the crowns of the *occluding* teeth; the act of mastication being performed by bringing the external *cusps* of the under molars opposite those of the upper; whence, by the lateral motion of the under jaw *inward*, their

external tubercles pass down the inclined surfaces of the external, and up those of the internal tubercles of the upper teeth, crushing in this action any interposed substance.

It will also be observed that, from the difference of width in the incisors of the two jaws, the central incisors of the upper extend over the centrals and half of the laterals of the under row, and that the superior laterals lie over the remaining half of the inferior laterals and the anterior half of the canines of the lower jaw. The canines close over the halves of the canines and first bicuspids while the first bicuspids impinge on the half of the first and half of the second bicuspids of the lower row. The second upper bicuspids close upon the anterior third of the opposing first molars and the posterior half of the second bicuspids.

The first molars oppose the posterior two thirds of the first, and one third of the second molars of the lower jaw, while the second upper molars close upon the unoccupied posterior third of the second and the anterior third of the wisdom teeth. The wisdom tooth of the upper being smaller in size than that of the lower jaw is perfectly opposed by that portion of the latter left unoccupied by the second upper molar tooth.

By this admirable arrangement no two teeth oppose each other only, but each tooth in closure of the jaw impinges upon two, so that should a tooth be lost, or even two alternate teeth, still the corresponding teeth of the opposite jaw are to some extent opposed, and thus remain useful. For when a tooth is wholly unopposed, a process is apt to be set up in the jaw by which the useless organ is gradually ejected. The direction of the teeth in the upper is vertically downwards and slightly forwards, while those of the lower jaw are placed vertically, the molars tending slightly inwards.

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For the purpose of description three parts of the tooth are distinguished by name, viz., the crown, neck, and root.

This distinction of parts which we make in describing human teeth, when we speak of crown, neck, and root is applicable to the great majority of mammalian teeth, though there are some few simple forms of teeth in which no such differentiation of parts can be seen.

The crown is that portion which is exposed above the borders of the gum, and is in human teeth coated with enamel; the neck is that portion which corresponds to the edge of the gum, and intervenes between the edges of the bony sockets and the edge of the enamel; the root is that part which is enclosed within the bony socket, and is covered by cementum.

Of these it is to be remarked that the "neck," although a convenient and necessary term for descriptive purposes, marks an arbitrary division of less importance than that expressed by crown and root; also that although this division into three parts can be made in the case of socketed teeth of limited growth, no such distinction of parts can be made in teeth of perpetual growth.

external *cusps* pass down the inclined surfaces of the external, and up those of the internal *cusps* of the upper teeth, crushing any interposed substance.

From the difference of width in the incisers of the two jaws, the central incisors of the upper extend over the centrals and half of the laterals of the under row, and the upper laterals extend over the remaining half of the lower laterals and the anterior half of the cuspids of the lower jaw. The cuspids of the upper jaw close over the halves of the cuspids and first bicuspids of the lower jaw, while the first bicuspids of the upper jaw *close* on the half of the first and half of the second bicuspids of the lower row. The second upper bicuspids close on the anterior third of the occluding first molars and the posterior half of the second bicuspids.

The first molars *appose* the posterior two thirds of the first and one third of the second molars of the lower jaw, while the second upper molars close on the unoccupied posterior third of the second and the anterior third of the wisdom teeth. The wisdom tooth of the upper being smaller than its mate it is *apposed* by that portion of the latter left unoccupied by the second upper molar tooth.

By this admirable arrangement no tooth *apposes* only one; but each tooth closes on two; so that, should a tooth be lost, or even two alternate teeth, still the corresponding teeth of the *apposite* jaw to some extent occlude, and thus remain useful. For when a tooth is wholly *unapposed*, it is sometimes gradually ejected. The direction of the teeth in the upper is slightly *forward*; those of the lower jaw are placed vertically, the molars tending slightly *inward*.

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For the purpose of description, three parts of the tooth are distinguished: the crown, the neck, and the root.

This distinction in the human teeth is applicable to the great majority of mammalian teeth, though there are a few simple forms of teeth without such distinctions.

The crown is that exposed above the borders of the gum, and is in human teeth covered with enamel; the root is enclosed within the bony socket, and is covered by cement; the neck is the constricted portion between the root and the crown.

This division into three parts can only be made in socketed teeth of limited growth—those which, when once erupted, assume their full size, and are incapable of farther growth, as in man; no such distinction is seen in teeth of perpetual growth— those of some animals which grow continually and shed their caps.

Don't fail to encourage your fellows in their efforts to break off from evil habits. Discouragement from their friends has sent many a man back to his evil ways. We are all weak somewhere, and need the strong arm of one who is strong where we are weak. If we are strong where he is weak, let us in charity and sympathy sit by his side as his fellow, and not look down on him as his superior.

Miscellaneous.

ANIMALS AS BAROMETERS.

I do not know of any surer way of predicting the changes in the weather, says a correspondent of the Cincinnati *Enquirer*, than by observing the habits of the snail. They do not drink, but imbibe moisture during a rain, and exude it afterward. This animal is never seen abroad except before a rain, when you will see it climbing the bark of trees and getting on the leaves. The tree snail, as it is called, two days before rain will climb up the stems of plants, and if the rain is going to be a hard and long one, then they get on the sheltered side of a leaf, but if a short rain, on the outside. Then there are other species that before a rain are yellow; after it, blue. Others indicate rain by holes and protuberances, which before a rain rise as large tubercles. These will begin to show themselves ten days before a rain. At the end of each tubercle is a pore which opens when the rain comes, to absorb and draw in the moisture. In other snails deep indentations, beginning at the head between the horns and ending with the jointure of the tail, appear a few days before a storm.

Every farmer knows when swallows fly low that rain is coming; sailors, when the sea gulls fly toward the land, when the stormy petrel appears, or Mother Carey's chickens, as they are called, predict foul weather.

Take the ants; have you ever noticed the activity they display before a storm—hurry, scurry, rushing hither and yon, as if they were letter carriers making six trips a day, or expressmen behind time? Dogs grow sleepy and dull, and like to lie before a fire as rain approaches; chickens pick up pebbles, fowls roll in the dust, flies sting and bite more viciously, frogs croak more clamorously, gnats assemble under trees, and horses display restlessness.

When yon see a swan flying before the wind, spiders crowding on a wall, toads coming out of their holes in unusual numbers of an evening, worms, slugs, and snails appearing, robin redbreasts pecking at our windows, pidgeons coming to the dovecote earlier than usual, peacocks squalling at night, mice squeaking, or geese washing, you can put them down as rain signs. Nearly all the animals have some way of telling the weather in advance. It may be that the altered condition of the atmosphere with regard to electricity, which generally accompanies changes of the weather, makes them feel disagreeable or pleasant. The fact that a cat licks herself before a storm is urged by some naturalists as proof of the special influences of electricity. Man is not so sensitive. Yet many feel listless before a storm, to say nothing of aggravated headaches, toothaches, rheumatism pains, and last, but not least, corns.

Starch.—The principal grain from which starch is manufactured is Indian corn—wheat and potatoes being used in limited quantities.

There are twenty-four factories in the United States manufacturing starch from corn. Fifteen of these are working under the new method, or chemical process, and producing about two-thirds of the

total amount made per annum. The others work by the old method, or fermentation process.

Indiana is the leading State of the Union in the production of starch from corn, having eight factories and producing more than one-third of the total amount made.

The total capacity of the mills manufacturing starch from corn is about 250,000,000 pounds per annum. The total number of pounds of starch of all kinds exported from the United States in the twelve months ending July 1, 1883, was 7,033,715.

The cousumption of starch for all purposes in the United States is about 160,000,000 pounds per annum, or an average of three pounds for each person.

SILVER-ALUMINUM ALLOY.

Aluminum and silver make handsome white alloys, which, compared to those from pure aluminum, are much harder, in consequence of which they take a much higher polish, and at the same time they are preferable to the silver-copper alloys for the reason that they are unchangeable in air, and retain their white color. It has been proposed, therefore, no longer to alloy the world's coin with copper, but with aluminum, which makes them far more durable, and even after a long-continued use they retain their white color. Experiments on a vast scale were for this purpose instituted in European countries, but for some reason not easily explained the silver-copper alloys were retained. According to the quantities of alluminum added, the alloys possess very varying physical characteristics. An alloy consisting of 100 parts aluminum and 5 parts silver differs but little from the pure aluminum, yet it is far harder and assumes a higer polish. An alloy consisting of 169 parts aluminum and 5 parts silver posseses a very remarkable degree of elasticity, and has therefore been recommended for the manufacture of balance springs for watches, and dessert knives. An alloy composed of equal parts of aluminum and silver rivals bronze in hardness.

HOMEOPATHIC PERFUMES.

The odoriferous molecule of musk must be incomprehensibly small, when we are told the particles one grain of musk has, in a radius of ninety feet, disengaged in one day. No microscopical power has yet been conceived to enable the human eye to see one of these atoms; yet the organs of smell have the sensitiveness to detect them. We cannot imagine their smallness, as it is stated that the same grain of musk undergoes absolutely no diminution in weight. A single drop of the oil of thyme, ground down with a piece of sugar and a little alcohol, will communicate its odor to twenty-five gallons of water. Haller kept for forty years papers perfumed with one grain of ambergris. After this time the odor was as strong as ever. Burdenave has evaluated a molecule of camphor sensible to the smell to 2,262,584,000th of a grain. Boyle has observed that one dram of asafetida exposed to the open air had lost in six days the eighth part of one grain, from which Keill concludes that in one minute it had lost one 69,-120th of a grain.

NITROGEN.

JAMES R. NICHOLS.

Nitrogen affords a striking example of the interesting and wonderful forms of matter. Its history and affinities are worthy of brief notice.

Nitrogen belongs to a class of bodies which are incapable of influencing any of the senses so far as to be recognized by them. It cannot be seen, tasted, nor touched so as to produce tangible impressions, and it has no odor. During all the ages, till within little more than a century, mankind were wholly ignorant of its existence. It is a form of matter found in a permanently aeriform state, or as a gaseous body, which under no ordinary conditions can be made to assume a solid or liquid form. The atmosphere is its home and hiding-place, and therefore it is constantly in close proximity with our bodies, and with everything existing on the earth. It passes into the cavity of the lungs of all breathing animals at every inspiration, traverses the circuit of the air-cells, and is expelled as nitrogen without diminution of volume or any chemical change. The volume of free nitrogen in the air is immense, and its weight as it rests on the earth's crust can be understood only by a consideration of the figures which approximately represent it. The whole weight of the nitrogen contained in the gaseous envelope of our planet may approximately be stated to be three quadrillions, nine hundred and ninety-four trillions, five hundred and ninety-two billions, nine hundred and twenty-five millions of *tons!* The popular notion of its use in the atmosphere, that it is simply a diluent of oxygen, is probably correct. It must subserve other and important purposes, but to ordinary observation it appears to have been supplied by the Supreme Intelligence, for the main purpose of so attenuating oxygen as to keep it within safe bounds as a respiratory agent and supporter of combustion. It is the most stupid, so to speak, and negative of the large family of elements. It resists chemical combinations with remarkable persistency, and when forced into such unions the affinity is slight and disruption is easy. It may be said to be the most unimportant and yet the most important of all the elements—a paradoxical statement easily comprehended by every chemist. It is docile, negative, unaggressive, in its natural state, but when forced into combination with oxygen it gives us acids with teeth sharp enough to gnaw a file. When combined with potash, and the resultant salt mixed with a little sulphur and charcoal, it gives us gunpowder, an agent well known to possess extraordinary properties. When associated with the bland and sweet substance known as glycerine, it forms nitro-glycerine, dynamite, lithofracture, giant-powder—agents so terrible as to appall mankind by their destructiveness. Shreds of cotton picked from the ripened bolls which open to the southern sun, when placed for a few moments in the acid which is born of nitrogen, suddenly lose their innocent nature, and become giants in power, capable of leveling forests and mountains at the touch of fire. Nitrogen forms the basis on which rests the great chemical forces so destructive and yet so useful to the race. It comes out of its chemical unions with a crash, but it at once assumes its usual dead condition, and floats in the air with all the harmlessness of the summer breeze. When introduced into the human or animal

organism, it originates and sustains nervous or muscular force. We move our limbs and conduct the physical labors of life through the agency of nitrogen or its compounds. Our animals—the oxen and horses which we rear—are serviceable in the yoke and harness only through the changes resulting in the combinations and elimination of nitrogen. After it has served its purpose in the body, it does not as a whole escape in the air, as when it is set free by explosions, but it appears in the liquid and solid excrement in certain forms of combination, which to become fixed and serviceable as plant food must receive intelligent care. The proneness of nitrogen to disassociate or free itself from its combinations is seen in the changes which excrement undergoes soon after leaving the animal organism. So long as any nitrogenous compound is controlled by the vital forces of animal life it is held in check and the equilibrium is preserved, but as soon as the external air is reached it struggles to free itself from its environment. The highly organized compounds take on fermentative changes; hydrogen is evolved, another gaseous body, and the nitrogen is led into an alliance with this element in such proportions as to form ammonia. Ammonia is distinguished for its volatility or readiness to escape, whether it be free or in the form of carbonate. This statement of what is supposed to be known of nitrogen, its nature, affinities, behavior, etc., may be regarded as applicable to many other simple and compound bodies. The attendant phenomena are not observable, neither are they distinctly understood; but the facts are deducible from the results of experiment with the aid of appliances which science supplies, therefore they are set down as known facts.

THE TREATMENT OF SICK HEADACHE.

Dr. W. Gill Wylie (*N. Y. Med. Journal.*), of New York, has produced excellent results with the following method of treatment: So soon as the first pain is felt, the patient is to take a pill or capsule containing one grain of inspissated ox gall and one drop of oil of gaultheria, every hour until relief is felt, or until six have been taken.

Dr. Wylie states that sick headache as such is almost invariably cut short by this plan, although some pain of a neuralgic character remains in a few cases.—*Detroit Lancet.*

TIERS ARGENT.

This alloy is much employed in the factories of Paris for the manufacture of silverware. As is indicated by its name, it consists of one-third, or 33.33 per cent. silver and two-thirds, or 66.66 per cent. aluminum, and is worked to great advantage, both by reason of its cheaper price (the kilogramme [43 ounces 3 dwts.] costing about 90 francs) and its superior hardness; at the same time, it is more easily pressed and engraved than the silver-copper alloys.

Mercury, says the editor of the *Problems of Nature*, is only silver in an unusual form. "It is obtained," he says, "by giving silver ore in considerable degree of decomposition. The particles of silver are allowed to come together and perform a motion as in the case of cells of plants or animals, in oil." This theory has the merit of being new.

HEALTH HINTS.

There's a skin without and a skin within,
A covering skin and a lining skin;
But the skin within is the skin without,
Doubled inward and carried complete throughout.
The palate, the nostrils, the windpipe and throat,
Are all of them lined with this inner coat,
Which through every part is made to extend,
Lungs, liver and bowels from end to end.
The outside skin is a marvelous plan
For exuding the dregs of the flesh of man;
While the inner extracts from the food and the air
What is needed the waste of the flesh to repair.
Any brandy or whisky, beer or gin,
Is apt to disorder the skin within;
While the skin, if dirty and dry, without
Refuses to let the sweat come out.
Good people all, have a care of your skin,
Both that without and that within;
To the first give plenty of water and soap,
To the last, little else but water, we hope.
But always be very particular where
You get your water, you food and your air;
For if these be tainted or rendered impure,
It will have it's effect on the blood, be sure.
The food which will ever for you be the best
Is that you like most and can soonest digest.
All unripe fruit and decaying flesh
Beware of, and fish that is not very fresh.
But of all things the most I would have you beware
Of breathing the poison of once-breathed air—
When in bed, whether out or at home you may be,
Always open the windows and let it go free.
With clothing and excercise keep yourself warm,
And change your clothes quickly if caught in a storm,
For a cold caught by chilling the outside skin
Flies at once to the delicate lining within.
All you who thus kindly take care of your skin,
And attend to its wants without and within,
Need never of cholera have any fears,
And your skin may last you a hundred years.

JOSEPH POWER, in *Pall Mall Gazette.*

For Taking Moles from the Face.—Croton oil, under the form of pomade or ointment, and tartar-emetic, under the form of paste or plaster, have each been successfully employed for the removal of moles or birthmarks, thus: Take tartar emetic in impalpable powder 15 grains, soap plaster 1 dram, and beat them to a paste. Apply this paste to nearly a line in thickness (not more), and cover the whole with strips of gummed paper. In four or five days eruption or suppuration will set in, and in a few days leave in place of the birthmark only a very slight scar. A good remedy for removing freckles:

R	Sulphocarbolate of zinc	1 ounce
	Glycerine...........................	12 ounces
	Rose water..........................	12 "
	Alcohol..............................	3 "
	Spirits of neorli....................	½ dram

Mix them. To be applied twice a day, leaving it on from half an hour to one hour.